APPENDIX A

GOLF COURSE WETLAND RESTORATION AND MITIGATION PROJECT

Revised Restoration Plan Version 5

Yellowstone Mountain Club
Big Sky, Montana

Prepared for:

YELLOWSTONE MOUNTAIN CLUB
P.O. Box 161097
Big Sky, Montana 59716

Prepared by:

LAND & WATER CONSULTING, INC.
P.O. Box 8254
Missoula, Montana 59807

June 11, 2004

Project No: 140347.005

LAND & WATER CONSULTING, INC.
1120 Cedar Street • P.O. Box 8254 • Missoula, Montana 59807 • Tel (406) 721-0354
E-mail info@landandwater.net • Fax (406) 721-0355

Yellowstone Mountain Club
Big Sky, Montana

GOLF COURSE WETLAND RESTORATION AND MITIGATION PROJECT

Revised Restoration Plan Version 5

June 11, 2004

Prepared for:

YELLOWSTONE MOUNTAIN CLUB
P.O. Box 161097
Big Sky, Montana 59716

Prepared by:

LAND & WATER CONSULTING, INC.
P.O. Box 8254
Missoula, Montana 59807

LAND & WATER

TABLE OF CONTENTS

TABLES, FIGURES and APPENDICES

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

This plan identifies the wetland restoration and mitigation sites and procedures for use at the Yellowstone Mountain Club (YMC) golf course near Big Sky, Montana. This restoration and mitigation plan is Appendix A to the Consent Decree. The locations described in this plan were selected in negotiations between the United States and YMC and other entities in which YMC admitted no liability and maintained its position regarding the jurisdictional status of alleged waters of the United States. Nothing in this document, including description of areas as "restoration" or "mitigation," constitutes a conclusion regarding the jurisdictional status of any location. No part of this document constitutes an admission of liability by YMC.

This restoration plan covers twelve disturbed wetland areas identified in previous versions (labeled G1, G2, etc. on **Appendix A**). Four restoration areas have been expanded and one mitigation area (labeled GC-M) was added to this plan (labeled 103, 103a, 111, 114 on **Appendix A**). For the purposes of this plan, areas 103 and 103a have been added to previous site G10 and are discussed together in the text and on figures and tables. Areas 111 and 114 have been added to previous restoration sites G8 and G5 respectively. The plan describes the steps by which wetlands or waters of the United States in the project area will be restored and subsequently monitored for success. Contributing to this plan were specialists in soil science, wetland ecology, botany, and hydrology. Information on which we have relied includes:

- Wetlands West wetland delineation report (2000).
- HDR, Inc. Revised Wetland Restoration Plan (2001) – now referred to as Version 2.
- Morrison-Maierle topographic survey and wetland location maps (2001).
- Land & Water Consulting fieldwork in 2002 and 2003.
- Land & Water Consulting Revised Golf Course Restoration Plans (June 2002 and April 2003) – now referred to as Versions 3 and 4.

2.0 METHODS

In June through September of 2002, LWC conducted fieldwork to examine areas of concern identified by the EPA and to review prior wetland delineations by Wetlands West (2000). Wetlands were identified, delineated and documented using COE Routine Wetland Determination forms. Wetland boundaries were flagged by LWC and later surveyed by Morrison-Maierle. In addition to routine wetland data, a complete plant species list was made in each wetland delineated by LWC and coverage was estimated for each plant species.

Wetland boundaries from the Wetland West report (2000) and the LWC effort in 2002 were transferred to a rectified 2001 air photo that also included topographic contours with an interval of 10 feet (Morrison-Maierle 2001). The original topography was identified using mapping by Morrison-Maierle (1999). This mapping has a contour interval of 2 feet and is based on 1999 air photography (pre-golf course construction).

Seven reference areas approved by EPA were identified across the golf course area with similar topography, hydrology, soils and vegetation to the restoration sites. Reference sites were used to select wetland plants for restoration. The reference sites may also be used to compare wetland vegetation, exotic plant invasion (including noxious weeds) or for evaluating wetland hydrology and soils. If restoration sites do not meet performance standards, these reference areas will be used to help identify potential reasons and solutions.

Plant species were selected for restoration representing shrubs, forbs, grasses and grass-like plants (sedges and rushes). Plants selected are those that are most common in the golf course reference wetlands and are most likely to establish successfully. Additional plant selections reflect plants that are common in the golf course wetlands and are commercially available as seed. Vegetation canopy coverage and constancy data were calculated for plant species proposed for use in restoration. These data were calculated for the seven reference areas and wetland areas delineated by LWC in 2002. Constancy is the percentage of the sites at which a plant occurred and is a measure of how common the plant is among a group of wetlands. All plant names in this report are according to Hitchcock and Cronquist (1973) *Flora of the Pacific Northwest.*

Guidance used to design this restoration plan was derived from many sources including Denbow and others (1996), Henry and Amoros (1995), Kolka and others (2000), Milner (2003), Mitsch and others (1998), Mitsch and Wilson (1996), Ossinger (1999), U.S. Army Corps of Engineers (1991c), Streever and Zedler (2000), U.S. Army Corps of Engineers: Sacramento District Regulatory Program (1996), U.S. Environmental Protection Agency (1993) and Zedler (2000). The most recent guidance document from the Army Corps used in this restoration plan was:

Army Corps of Engineers. 2002. *Guidance on Compensatory Mitigation Projects for Aquatic Resource Impacts Under the Corps Regulatory Program Pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899.* Regulatory Guidance Letter No. 02-2 dated December 24, 2002. 16p.

Stable stream channels were designed for those sites requiring channel reconstruction. Channel design procedures presented here were based on principles contained in Chin (1989), Montgomery and Buffington (1997), Rosgen (1996), Thomas & Others (2000), and U.S. Army Corps of Engineers (1991).

In September 2002, after qualified approval was granted by EPA, topographical and hydrological restoration was conducted on nine of the restoration locations, removing fill or recontouring to pre-disturbance levels. Additional fieldwork was conducted in 2003 including seed collection, monitoring well installation, restored sites observations and field reviews with agency personnel. In addition, in fall 2003 the topographic adjustment of Site G1 was completed.

3.0 GENERAL RESTORATION AND MITIGATION PLAN

3.1 Restoration Philosophy and Approach

This plan is designed to restore wetland conditions at each site on the YMC golf course area. For mitigation activities the plan is designed to enhance and create wetland conditions similar to reference wetlands. These goals will be achieved by:

1. **Topographic Adjustment**: Re-creating the original topography through excavation, filling or adjusting to produce topography that promotes wetland conditions.
2. **Hydrologic Restoration**: Allowing the wetland hydrologic regime to re-establish or enhancing hydrologic conditions that promote wetland conditions. Reconstructing stream channels where needed.
3. **Soil Restoration**: Exposing the original wetland soil or establishing hydrologic conditions that encourage formation of hydric soil features.
4. **Vegetation Restoration**: Allowing the original wetland vegetation to re-establish and/or planting vegetation similar to that which occurs in reference wetlands or channels.
5. **Erosion Control**: Providing erosion control where needed.
6. **Success Criteria**: Identifying success criteria for restoration and mitigation activities.
7. **Contingency Plans**: Establishing contingency plans for sites that do not meet success criteria.
8. **Monitoring**: Monitoring wetland restoration and mitigation sites and reference wetlands for comparison with each other and with success criteria.
9. **Scheduling**: Maintaining a schedule with timelines for all restoration, mitigation and monitoring activities.
10. **Reporting**: Providing YMC and EPA with timely reports summarizing activities and conditions.

3.2 Restoration And Mitigation Activities

This section describes the details of each restoration activity listed above. The complete size of sites subject to restoration and mitigation activities is set forth in **Table 3**.

3.2.1 Topographic Adjustment

Topographic adjustment was conducted on nine sites in the fall of 2002 and was described in restoration progress reports submitted previously. These sites include G3-NE, G3-SW, G4, G6, G7, G8, G9, G10 and G11. Topographic adjustment was successful in identifying the original wetland soil surface at sites that had been filled. Additional detail is provided in the site-specific descriptions in **Section 4**. Additional topographic adjustment may occur at all sites following monitoring well results in spring/early summer 2004. Topographic adjustment was also completed at site G1 in 2003. Topographic adjustment will also occur at new sites (GC-M, 103, 103a, 111, 114) as indicated in the site-specific plans. Monitoring well data for the fall of 2003 has previously been provided to EPA. See Appendix F. Data for spring 2004 will be provided to

EPA biweekly during the spring as discussed in Section 5.1 with a final report provided to EPA by July 12, 2004. That report will contain any recommendations for additional topographic adjustments. EPA will approve or suggest modifications to that report by July 23, 2004, after which time topographic adjustments will occur.

The goal of topographic adjustment was to return each site to its original topography where possible or to create a topography that promotes wetland conditions. On sites where wetlands were filled, the original surface elevation was estimated using 1999 aerial survey data. Excavations were made to this elevation with oversight by a soil scientist who confirmed the estimated elevation or adjusted the elevation based on identifying the original soil surface. If the original soil surface could not be identified, the site was excavated to the level indicated by the 1999 survey.

On sites where wetlands were excavated below the original topography, fill was used to raise the current elevation back to that indicated on the 1999 survey. Soil used for fill came from adjacent areas of the golf course. Soil used for fill had wetland soil characteristics whenever possible (hydric soils are also present outside jurisdictional areas of the golf course).

Grading plans were developed to guide topographic adjustment and are attached as a separate document (**Appendix D**). These grading plans illustrate the original surface topography according to the 1999 aerial survey and compare it with the current topography according to a ground survey completed in 2001. Surveyors used this information to stake cuts and/or fills needed to restore the original topography. The soil scientist and equipment operators used this staking to anticipate the depth of the pre-disturbance surface.

3.2.2 Hydrologic Restoration

Hydrologic restoration will result in a wetland moisture regime that meets wetland criteria and that results in wetland soil and wetland vegetation development. Hydrologic restoration will also include reconstructing stable stream channels. Hydrologic restoration will result in conditions similar to pre-disturbance conditions and similar to the reference sites.

Water monitoring wells were installed in 2003 at most restoration and reference sites. A report on the hydrologic monitoring conducted in 2003 is attached as Appendix F.

Wetland hydrology will be monitored in each restored wetland (except G12) and each reference area. Until post-restoration hydrology is monitored, no specific actions are planned to modify flow routes or amounts in the disturbed wetland areas. Water spreaders and fabric/rock outlets may be installed where appropriate to promote even water distribution and prevent erosion of downhill sites (**Figures 2a** and **2b**). Logs will also be used on sites G1, G3, G5/114, G7, G8/111, G10/103/103a and GCM to promote even water distribution across the wetland area as illustrated in (**Figure 2a**). Logs will not be used at other sites due to their small size, inaccessibility or because they already have large woody debris. These logs will be approximately twelve inches in diameter and will be partially buried so that three to four inches are exposed above the ground surface. Logs will be oriented across the contour and staggered

down the slope to promote even water distribution. The number of logs will vary by site due to size, steepness and other conditions.

One wetland restoration site (G1) included an impacted stream channel. In 2003, the stream channel was restored using accepted fluvial geomorphologic principles and the natural channel design philosophy. The impacted stream was comparatively steep (greater than 3%) and narrow (less than 2 feet). The bed and banks of the reconstructed channel were designed to withstand anticipated shear stress conditions for the near-term until mature vegetation can become established. Erosion control fabric was used to stabilize the streambanks and floodplain areas until vegetation can become firmly rooted. The remaining restoration work for site G1 is described below.

3.2.3 Soil Restoration

Soil restoration will result in soil conditions that meet wetland criteria and that support healthy wetland vegetation. On sites where wetlands were filled, soil restoration has concentrated and will concentrate on removing the overlying fill and exposing the original wetland soil. Pre-disturbance topographic information is used to approximate the original wetland soil surface. Excavations are made to this depth and examined by a professional soil scientist to more accurately determine the location of the original wetland surface. Once the original surface is located, careful excavation proceeds to remove the overlying fill across the entire restoration site.

Wetland soils at this location are distinct and easy to recognize. They typically have a dark, almost black surface layer with abundant organic matter. The subsoil typically has distinct gley colors with distinct mottles.

On sites where wetlands were excavated, soil restoration may include adding soil materials to restore the pre-disturbance topography. Soil material selected for this purpose comes from adjacent sites on the golf course, in most cases from restoration activities that result in removal of material from filled wetlands. This soil material is segregated to provide a final surface layer with characteristics as close to those of the original wetland soil as possible. Fieldwork in 2002 revealed that much of the soils in upland areas of the golf course have hydric characteristics even though the vegetation and hydrology do not meet wetland criteria.

Monitoring will evaluate development of wetland soil conditions.

3.2.4 Vegetation Restoration/Mitigation

Vegetation restoration/mitigation will result in a dominance of wetland vegetation similar to that present in wetlands across the golf course. The information used to determine vegetation restoration/mitigation includes:

- A complete species list for all plants identified on the golf course (**Table 1**).
- Army Corps Routine Wetland Determination forms for each wetland mapped by LWC in 2002.

- Complete plant species lists for each individual wetland mapped by LWC including canopy coverage for each species.
- Reference wetland site evaluations for the seven reference wetlands including complete plant species lists (**Appendix C**).
- Constancy data calculations for plant species documented on Army Corps forms for all wetlands at the golf course (**Appendix C**).
- Experience of LWC, EPA and custom plant material providers with the success of potential plant species for restoration/mitigation.
- Groundwater monitoring data presented in Appendix F and additional data to be collected in Spring 2004

Wetland Plant Species Selection

Table 1 lists the 172 plant species observed on the golf course during fieldwork and the wetland status of each. **Appendix C** contains detailed vegetation data from each of seven undisturbed reference wetlands including species, canopy coverage and constancy values. Each reference wetland is labeled according to its corresponding wetland restoration area(s). Reference wetland locations are illustrated on the map in **Appendix A**. Examination of the wetland areas delineated in 2002 and the proposed wetland reference areas suggest that these areas are mainly dominated by similar plant species.

Wetland Plant Species Selected for Restoration/Mitigation

Table 2 lists the plant species proposed for restoration/mitigation at the golf course, the source of plant materials and the method of planting. These species were selected based on:

1. Their abundance in golf course wetlands as documented by coverage values and constancy calculations presented in **Appendix C**.
2. Their availability for purchase and the practicality of seed collection at the golf course.
3. Their likelihood for success based on the experience of LWC, EPA and custom plant material providers.

Trees will be a minimum of 6 feet tall and will be transplanted from adjacent sites or purchased as nursery stock. Shrubs will be purchased as nursery stock and planted. Grasses will be purchased and planted as seed. Sedges will be purchased as seed then grown and planted as plugs. Rushes and forbs will be collected as seed, grown in a greenhouse as plugs and planted. Plugs will be grown in 10 cubic inch containers. Trees will be planted in selected restoration sites subject to the limitations described below.

Table 1: ***Plant Species Observed at the Yellowstone Mountain Club Golf Course Wetland Restoration Project***

Scientific Name	Common Name	Wetland Status [1]
Abies lasiocarpa	sub-alpine fir	FACU
Achillea millefolium	Yarrow	FACU
Actaea rubra	Baneberry	--
Agoseris aurantiaca	false-dandelion	FAC
Agropyron dasystachyum	thick-spike wheatgrass	FACU-
Agrostis exarata	Spike bentgrass	FACW
Allium brevistylum	Short-style onion	--
Alopecurus pratensis	Meadow-foxtail	FACW
Amelanchier alnifolia	Western serviceberry	FACU
Angelica arguta	Lyall's angelica	FACW
Antennaria spp.	Pussy-toes	--
Aquilegia flavescens	Yellow columbine	--
Arnica cordifolia	Heartleaf arnica	--
Arnica latifolia	Mountain arnica	FAC-
Arnica longifolia	seep-spring arnica	FACW
Artemisia tridentata	big sagebrush	--
Aster conspicuus	Showy aster	--
Aster foliaceus	leafy-bracted aster	FACW-
Astragalus alpinus	Alpine milkvetch	FAC-
Astragalus spp.	Milkvetch	--
Berberis repens	Oregon grape	--
Bromus ciliatus	Fringed brome	FAC+
Bromus carinatus	Mountain brome	--
Bromus inermis	Smooth brome	--
Calamagrostis canadensis	blue-joint reedgrass	FACW+
Calamagrostis rubescens	Pinegrass	--
Caltha leptosepala	Marsh-marigold	OBL
Calypso bulbosa	Calypso's fairy-slipper	FAC+
Campanula rotundifolia	Scotch bellflower	FACU+
Carex aquatilis	Water sedge	OBL
Carex concinnoides	northwest sedge	--
Carex disperma	soft-leaf sedge	FACW
Carex geyeri	elk sedge	--
Carex hoodii	Hood's sedge	NI
Carex microptera	small-wing sedge	FAC
Carex neurophora	alpine nerve sedge	FACW
Carex norvegica	Scandinavian sedge	FACW
Carex phaeocephala	mountain-hare sedge	FACU
Carex raynoldsii	Raynolds' sedge	FACU
Carex rossii	Ross sedge	--
Carex scopulorum (ww)	Holm's Rocky Mountain sedge	FACW
Carex rostrata (syn. *Carex utriculata)*	beaked sedge	OBL
Castilleja miniata	scarlet Indian-paintbrush	FAC
Castilleja rhexifolia	rhexia-leaf Indian paintbrush	FAC
Centaurea maculosa	spotted knapweed	--
Cirsium arvense	Canada thistle	FACU+
Collinsia parviflora	small flowered blue-eyed Mary	--
Collomia linearis	narrow leaf collomia	FACU
Dactylis glomerata	orchard grass	FACU
Danthonia intermedia	vasey oatgrass	FACU+
Delphinium bicolor	Montana larkspur	--
Deschampsia cespitosa	tufted hairgrass	FACW
Deschampsia elongata	slender hairgrass	FACW-
Dracocephalum parviflorum	American dragonhead	FACU
Elymus glaucus	blue wild-rye	FACU
Epilobium angustifolium	fireweed	FACU+
Epilobium ciliatum	hairy willow-herb	FACW-
Epilobium paniculatum	autumn willow-herb	--
Equisetum arvense	field horsetail	FAC
Equisetum hyemale	rough horsetail	FACW

[1] **OBL**=Obligate Wetland Plant, occurrence in wetlands is >99%.
FACW=Facultative Wetland Plant, occurrence in wetlands is 67-99%.
FAC=Facultative Plants, occurrence in wetlands is 34-66%.
FACU=Facultative Upland Plants, occurrence in wetlands is 1-33%.
'+'=indicates wetter; '-'=indicates drier.
NI=No Indicator status available due to inconclusive data; '- -'= Plant not evaluated.

LAND & WATER

Table 1 (continued): ***Plant Species Observed at the Yellowstone Mountain Club Golf Course Wetland Restoration Project***

Scientific Name	Common Name	Wetland Status	Scientific Name	Common Name	Wetland Status[1]
Erigeron peregrinus	Wandering fleabane	FACW	*Ledum glandulosum*	Labrador tea	FACW+
Erythronium grandiflorum	Glacier lily	FAC-	*Ligusticum* spp.	lovage	--
Festuca idahoensis	Idaho fescue	--	*Linaria vulgaris*	butter-n-eggs	--
Fragaria virginiana	Virginia strawberry	--	*Linnaea borealis*	twinflower	FACU-
Galium aparine	Catchweed bedstraw	FACU	*Lonicera utahensis*	Utah honeysuckle	FACU+
Galium boreale	Northern bedstraw	FACU	*Lupinus* spp.	lupine	--
Galium triflorum	Sweet-scent bedstraw	FACU	*Luzula parviflora*	small-flower woodrush	FAC-
Geranium richardsonii	White geranium	FACU+	*Melica spectabilis*	showy melica	FAC
Geranium viscosissimum	Sticky purple geranium	FACU+	*Mertensia ciliata*	streamside bluebells	FACW+
Geum macrophyllum	Large-leaf avens	FACW+	*Mimulus guttatus*	common monkey-flower	OBL
Glyceria elata	tall manna grass	FACW+	*Mimulus lewisii*	Lewis' monkey-flower	FACW+
Glyceria grandis (syn. *G. maxima)*	read meadowgrass	OBL	*Mitella pentandra*	five-point bishop's-cap	FACW+
Habenaria dilatata (syn. *Platanthera dilatata)*	leafy white orchid	FACW+	*Nemophila brevifolia*	Great Basin nemophila	--
Haplopappus spp.	Goldenweed	--	*Osmorhiza chilensis*	mountain sweet cicely	--
Heracleum lanatum	cow-parsnip	FAC	*Parnassia fimbriata*	fringed grass-of-parnassus	OBL
Hordeum brachyantherum	Meadow barley	FACW	*Pedicularis bracteosa*	bracted lousewort	--
Hieracium albiflorum	White-flowered hawkweed	--	*Pedicularis groenlandica*	pink elephant's head	OBL
Hydrophyllum capitatum	wool breeches	--	*Phacelia heterophylla*	virgate scorpion weed	FACU
Iliamna rivularis	Streambank hollyhock	FAC-	*Phleum alpinum*	alpine timothy	FAC
Juncus balticus	Baltic rush	OBL	*Phleum pratense*	timothy	FACU
Juncus confusus	Colorado rush	FAC	*Picea engelmannii*	Engelmann's spruce	FAC
Juncus ensifolius	Drummond's rush	FACW	*Pinus albicaulis*	white-barked pine	--
Juncus drummondii	Three-stamen rush	FACW-	*Pinus contorta*	lodgepole pine	FAC-
Juncus mertensianus	Merten's rush	OBL	*Plantago lanceolata*	English plantain	FACU+
Juncus parryi	Parry's rush	FAC+	*Plantago tweedyi*	Tweedy's plantain	--
Juncus regelii	Regel's rush	FACW	*Poa alpina*	alpine bluegrass	FAC
Juniperus communis	Common juniper	--	*Poa grayana* (syn. *Poa arctica)*	arctic bluegrass	FACU

[1] **OBL**=Obligate Wetland Plant, occurrence in wetlands is >99%.
FACW=Facultative Wetland Plant, occurrence in wetlands is 67-99%.
FAC=Facultative Plants, occurrence in wetlands is 34-66%.
FACU=Facultative Upland Plants, occurrence in wetlands is 1-33%.
'**+**'=indicates wetter; '**-**'=indicates drier.
NI=No Indicator status available due to inconclusive data; '**- -**'= Plant not evaluated.

LAND & WATER

Table 1 (continued): ***Plant Species Observed at the Yellowstone Mountain Club Golf Course Wetland Restoration Project***

Scientific Name	Common Name	Wetland Status	Scientific Name	Common Name	Wetland Status[1]
Poa interior (syn. *Poa nemoralis)*	Woods bluegrass	FAC	*Senecio dimorphophyllus*	Payson's groundsel	--
Poa palustris	fowl bluegrass	FAC	*Senecio serra*	tall groundsel	FAC
Poa pratensis	Kentucky bluegrass	FACU+	*Senecio sphaerocephalus*	ball-head groundsel	FACW
Polygonum bistortoides	American bistort	FACW+	*Senecio triangularis*	arrow-leaf groundsel	FACW+
Polygonum spp.	Polygonum	--	*Shepherdia canadensis*	Canada buffaloberry	NI
Populus tremuloides	Quaking aspen	FAC+	*Smilacina stellata*	Starry Solomon's-seal	FAC-
Potentilla arguta	tall cinquefoil	FACU	*Solidago* spp.	goldenrod	--
Potentilla diversifolia	Varileaf cinquefoil	FACU	*Sorbus scopulina*	Greene's mountain ash	NI
Potentilla gracilis (ww)	Northwest cinquefoil	FAC	*Spergularia rubra*	purple sandspurry	FAC-
Pseudotsuga menziesii	Douglas-fir	--	*Spiraea betulifolia*	white spirea	NI
Pyrola asarifolia	pink wintergreen	FACU	*Stellaria umbellata*	umbellate starwort	FAC+
Pyrola secunda	one-sided wintergreen	FACU	*Stipa* spp.	needle-n-thread grass	--
Ranunculus eschscholtzii	Eschscholtz buttercup	FACW	*Streptopus amplexifolius*	twisted stalk	FAC-
Ranunculus gmelinii	small yellow water buttercup	FACW	*Symphoricarpos* spp.	snowberry	--
Ranunculus uncinatus	Hooked buttercup	FAC	*Taraxacum officinale*	dandelion	FACU
Ribes hudsonianum	Hudson Bay currant	OBL	*Thalictrum occidentale*	western meadowrue	FACU
Ribes lacustre	Prickly currant	FAC+	*Thelypodium paniculatum*	thelypody	--
Ribes viscosissimum	Sticky currant	NI	*Thelypodium sagittatum*	slender thelypody	--
Rosa woodsii	Wood rose	FACU	*Tragopogon dubius*	yellow salsify	--
Rumex paucifolius	few-leaved dock	FAC-	*Trifolium* spp.	clover	--
Salix bebbiana	Bebb willow	FACW	*Trollius laxus*	American globeflower	OBL
Salix boothii	Booth's willow	OBL	*Typha latifolia*	broad-leaf cattail	OBL
Salix exigua	Sandbar willow	OBL	*Vaccinium globulare*	globe huckleberry	--
Salix lemmonii	Lemmon's willow	FACW+	*Vaccinium scoparium*	grouse whortleberry	FACU-
Salix lutea	Yellow willow	OBL	*Valeriana sitchensis*	Sitka valerian	FAC
Salix planifolia	Diamond-leaf willow	OBL	*Veronica americana*	American speedwell	OBL
Sambucus racemosa var. *melanocarpa (Sambucus melanocarpa)*	Black elderberry	FACU	*Veronica serpyllifolia*	Thyme-leaf speedwell	FAC
Saxifraga arguta (syn. *Saxifraga odontoloma)*	Brook saxifrage	FACW+	*Veronica wormskjoldii*	American alpine speedwell	FAC+
Sedum spp.	Stonecrop	--	*Zigadenus elegans*	mountain death-camas	FAC+

[1] **OBL**=Obligate Wetland Plant, occurrence in wetlands is >99%.
FACW=Facultative Wetland Plant, occurrence in wetlands is 67-99%.
FAC=Facultative Plants, occurrence in wetlands is 34-66%.
FACU=Facultative Upland Plants, occurrence in wetlands is 1-33%.
'+'=indicates wetter; '-'=indicates drier.
NI=No Indicator status available due to inconclusive data; '- -'= Plant not evaluated.

Table 2: ***Plant Species and Sources Selected for Restoration/Mitigation***

Scientific Name	Common Name	Source
Trees		
Abies lasiocarpa	Subalpine fir	Transplant or purchase nursery stock and plant
Picea engelmannii	Engelmann spruce	Transplant or purchase nursery stock and plant
Shrubs		
Lonicera involucrata	Honeysuckle	Purchase nursery stock and plant
Ribes lacustre	Prickly currant	Purchase nursery stock and plant
Grasses, Sedges and Rushes		
Calamagrostis canadensis	Blue-joint reedgrass	Purchase seed and plant as seed
Carex aquatilis	Water sedge	Purchase seed, grow container plugs and plant
Carex microptera	Small-wing sedge	Purchase seed, grow container plugs and plant
Carex rostrata (utriculata)	Beaked sedge	Purchase seed, grow container plugs and plant
Elymus glaucus	Blue wild rye	Purchase seed and plant as seed
Glyceria elata	Tall mannagrass	Purchase seed and plant as seed
Juncus ensifolius/regelii	Drummonds/Regels rush	Collect seed, grow container plugs and plant
Forbs		
Geum macrophyllum	Large-leaf avens	Collect seed, grow container plugs and plant
Heracleum lanatum	Cow parsnip	Collect seed, grow container plugs and plant
Mimulus guttatus	Monkey flower	Purchase seed, grow container plugs and plant
Saxifrage arguta	Brooks saxifrage	Collect seed, grow container plugs and plant
Senecio triangularis	Arrowleaf groundsel	Collect seed, grow container plugs and plant
Trollius laxus	American globe flower	Collect seed, grow container plugs and plant

Vegetation Prescriptions

Table 3a lists approximate vegetation prescriptions for each restoration/mitigation site. Note that a portion of site G1 has already been revegetated and only portions of sites G2 and G4 need revegetation. The prescriptions use the plant species listed in **Table 2** above but are customized for each site based on data from adjacent reference wetlands (**Appendix C**). The prescriptions in **Table 3a** include acreages, numbers of plugs, pounds of seed and numbers of trees for the individual restoration/mitigation sites. The vegetation prescriptions (species selection and distribution within sites) consider ecological conditions as well as planned use of nearby uplands.

Wetland Coir

Wetland coir (manufactured wetland sod) may be used on some restoration and mitigation sites. This wetland coir would be custom-grown to contain sedge, rush and grass species listed in Table 2. The most likely place of use would be G10 following final topographic adjustment if that final topography includes steeper slopes with erosion concerns. The wetland coir would be placed along the most likely paths of surface water runoff or used in a manner similar to drop structures to armour short steep slopes between less steep portions of the wetland. Use of wetland coir may result in adjustments to the distribution of plants.

Table 3: ***Golf Course Restoration Sites***

Site	Quadrant	Restoration Area Size (FT2)	Restoration Area Size (Acres)
G1	NE	16,289	0.37
G2	NE	4,533	0.10
G3SW	NE	7,464	0.17
G3NE	NE	4,403	0.1
G4	NE	8,143	0.19
G5	NW	718	0.02
G6	NW	140	0.003
G7	NW/SW	12,832	0.29
G8	NW	1,983	0.05
G9	SW	193	0.004
G10	NW	36,451	0.84
G11	SE	2,914	0.07
G12	SE	541	0.01
GC-M	NW	6,712	0.15
103	NW	15,835	0.36*
103a	NW	7,818	0.18
111	NW	7,794	0.18*
114	NW	3095	0.07
Total		**137,858**	**3.16**

* Size may be adjusted in 2004. These figures are used throughout this plan and are subject to the same potential adjustments.

Table 3a: ***Golf Course Revegetation Prescriptions (note some sites are combined-see site column, also note acreages in this table reflect only the remaining area needing revegetation at each site)***

Site	Acres	Scientific Name	Common Name	# Plugs	Lbs. Seed	# Trees
G1	**0.25**	Abies lasiocarpa	sub-alpine fir			5
		Picea engelmannii	Engelmann's spruce			5
		Lonicera involucrata	Honeysuckle	209		
		Calamagrostis canadensis	blue-joint reedgrass		3.75	
		Carex microptera	small-winged sedge	511		
		Carex utriculata	Beaked sedge	556		
		Juncus regelii	Regel's rush	1,255		
		Geum macrophyllum	large-leaf avens	627		
			Total	**3,158**	**3.75**	**10**
G2	**0.01**	Calamagrostis canadensis	blue-joint reedgrass		1.5	
		Carex aquatilis	water sedge	27		
		Carex utriculata.	beaked sedge	27		
		Juncus ensifolius	Drummond's rush	18		
		Heracleum lanatum	cow-parsnip	18		
		Mimulus guttatus	common monkey-flower	18		
		Senecio triangularis	arrow-leaf groundsel	18		
			Total	**126**	**1.5**	**0**
G3SW	**0.17**	Abies lasiocarpa	sub-alpine fir			2
		Picea engelmannii	Engelmann's spruce			2
		Ribes lacustre	prickly currant	249		
		Carex aquatilis	water sedge	355		
		Carex microptera	small-winged sedge	355		
		Glyceria elata	tall manna grass		2.55	
		Juncus regelii	Regel's rush	249		
		Geum macrophyllum	large-leaf avens	249		
		Heracleum lanatum	cow-parsnip	41		
		Senecio triangularis	arrow-leaf groundsel	400		
		Trollius laxus	American globeflower	249		
			Total	**2,147**	**2.55**	**4**
G3NE	**0.10**	Ribes lacustre	prickly currant	147		
		Carex aquatilis	water sedge	203		
		Carex microptera	small-winged sedge	203		
		Glyceria elata	tall manna grass		1.5	
		Juncus regelii	Regel's rush	147		
		Geum macrophyllum	large-leaf avens	147		
		Heracleum lanatum	cow-parsnip	24		
		Senecio triangularis	arrow-leaf groundsel	245		
		Trollius laxus	American globeflower	147		
			Total	**1,263**	**1.5**	**0**

Table 3a ***(continued): Golf Course Revegetation Prescriptions (note some sites are combined-see site column, also note acreages in this table reflect only the remaining area needing revegetation at each site)***

Site	Acres	Scientific Name	Common Name	# Plugs	Lbs. Seed	# Trees
G4	0.06	Calamagrostis canadensis	blue-joint reedgrass		0.9	
		Carex aquatilis	water sedge	176		
		Carex utriculata	beaked sedge	175		
		Juncus ensifolius	Drummond's rush	87		
		Heracleum lanatum	cow-parsnip	146		
		Mimulus guttatus	common monkey-flower	87		
		Senecio triangularis	arrow-leaf groundsel	87		
			Total	**758**	**0.9**	**0**
G5	0.02	Abies lasiocarpa	sub-alpine fir			2
114	0.07	Picea engelmannii	Engelmann's spruce			2
		Ribes lacustre	prickly currant	10		
		Calamagrostis canadensis	blue-joint reedgrass		0.67	
		Carex aquatilis	water sedge	168		
		Carex utriculata	beaked sedge	167		
		Elymus glaucus	blue wild-rye		0.67	
		Juncus regelii	Regel's rush	571		
		Geum macrophyllum	large-leaf avens	57		
		Heracleum lanatum	cow-parsnip	10		
		Mimulus guttatus	common monkey-flower	96		
		Senecio triangularis	arrow-leaf groundsel	57		
			Total	**1,137**	**1.34**	**4**
G6	0.003	Abies lasiocarpa	sub-alpine fir			2
		Calamagrostis canadensis	blue-joint reedgrass		0.04	
		Carex microptera	small-winged sedge	24		
		Juncus regelii	Regel's rush	24		
		Geum macrophyllum	large-leaf avens	2		
		Senecio triangularis	arrow-leaf groundsel	2		
		Saxifraga arguta	brook saxifrage	2		
		Trollius laxus	American globeflower	2		
			Total	**56**	**0.04**	**2**

Table 3a ***(continued): Golf Course Revegetation Prescriptions (note some sites are combined-see site column, also note acreages in this table reflect only the remaining area needing revegetation at each site)***

Site	Acres	Scientific Name	Common Name	# Plugs	Lbs. Seed	# Trees
G7	0.29	Abies lasiocarpa	sub-alpine fir			4
		Picea engelmannii	Engelmann's spruce			4
		Ribes lacustre	prickly currant	244		
		Calamagrostis canadensis	blue-joint reedgrass		4.35	
		Carex aquatilis	water sedge	655		
		Carex utriculata	beaked sedge	652		
		Juncus ensifolius	Drummond's rush	812		
		Geum macrophyllum	large-leaf avens	406		
		Heracleum lanatum	cow-parsnip	244		
		Senecio triangularis	arrow-leaf groundsel	406		
		Trollius laxus	American globeflower	244		
			Total	**3,663**	**4.35**	**8**
G8	0.05	Abies lasiocarpa	sub-alpine fir			1
111	0.18	Picea engelmannii	Engelmann's spruce			1
		Ribes lacustre	prickly currant	123		
		Carex aquatilis	water sedge	427		
		Carex microptera	small-winged sedge	427		
		Carex utriculata	beaked sedge	427		
		Calamagrostis canadensis	blue-joint reedgrass	0	1.7	
		Geum macrophyllum	large-leaf avens	411		
		Glyceria elata	tall manna grass		1.7	
		Juncus ensifolius	Drummond's rush	123		
		Habenaria dilatata	leafy white orchid	21		
		Heracleum lanatum	cow-parsnip	411		
		Senecio triangularis	arrow-leaf groundsel	411		
		Trollius laxus	American globeflower	124		
			Total	**2,905**	**3.4**	**2**
G9	0.004	Abies lasiocarpa	sub-alpine fir			1
		Picea engelmannii	Engelmann's spruce			1
		Ribes lacustre	prickly currant	5		
		Calamagrostis canadensis	blue-joint reedgrass		0.03	
		Carex utriculata	beaked sedge	51		
		Elymus glaucus	blue wild-rye		0.03	
		Geum macrophyllum	large-leaf avens	5		
		Heracleum lanatum	cow-parsnip	5		
		Senecio triangularis	arrow-leaf groundsel	5		
			Total	**71**	**0.06**	**2**

Table 3a ***(continued): Golf Course Revegetation Prescriptions (note some sites are combined-see site column, also note acreages in this table reflect only the remaining area needing revegetation at each site)***

Site	Acres	Scientific Name	Common Name	# Plugs	Lbs. Seed	# Trees
G10	**0.84**	Ribes lacustre	prickly currant	758		
103	**0.36**	Calamagrostis canadensis	blue-joint reedgrass		10.35	
103a	**0.18**	Carex aquatilis	water sedge	2,920		
		Carex microptera	small-winged sedge	2,875		
		Carex utriculata.	beaked sedge	2,920		
		Glyceria elata	tall manna grass		10.35	
		Geum macrophyllum	large-leaf avens	1,263		
		Juncus ensifolius	Drummond's rush	758		
		Habenaria dilatata	leafy white orchid	126		
		Heracleum lanatum	cow-parsnip	2,526		
		Senecio triangularis	arrow-leaf groundsel	2,526		
		Trollius laxus	American globeflower	760		
			Total	**17,432**	**20.70**	**0**
G11	**0.07**	Abies lasiocarpa	sub-alpine fir			2
		Picea engelmannii	Engelmann's spruce			2
		Ribes lacustre	prickly currant	44		
		Carex microptera	small-winged sedge	229		
		Carex utriculata.	beaked sedge	228		
		Calamagrostis canadensis	blue-joint reedgrass		0.52	
		Glyceria elata	tall manna grass		0.52	
		Geum macrophyllum	large-leaf avens	74		
		Heracleum lanatum	cow-parsnip	44		
		Mimulus guttatus	common monkey-flower	44		
		Saxifraga arguta	brook saxifrage	74		
		Senecio triangularis	arrow-leaf groundsel	147		
			Total	**884**	**1.04**	**4**
G12	**0.01**	Ribes lacustre	prickly currant	10		
		Calamagrostis canadensis	blue-joint reedgrass		0.07	
		Carex microptera	small-winged sedge	51		
		Carex utriculata.	beaked sedge	50		
		Elymus glaucus	blue wild-rye		0.07	
		Geum macrophyllum	large-leaf avens	10		
		Heracleum lanatum	cow-parsnip	20		
		Senecio triangularis	arrow-leaf groundsel	15		
			Total	**126**	**0.14**	**0**

Table 3a ***(continued): Golf Course Revegetation Prescriptions (note some sites are combined-see site column, also note acreages in this table reflect only the remaining area needing revegetation at each site)***

Site	Acres	Scientific Name	Common Name	# Plugs	Lbs. Seed	# Trees
GC-M	0.15	Ribes lacustre	prickly currant	85		
		Carex microptera	small-winged sedge	475		
		Carex utriculata.	beaked sedge	475		
		Calamagrostis canadensis	blue-joint reedgrass		1.3	
		Glyceria elata	tall manna grass		1.3	
		Geum macrophyllum	large-leaf avens	141		
		Juncus ensifolius	Drummond's rush	85		
		Habenaria dilatata	leafy white orchid	14		
		Heracleum lanatum	cow-parsnip	253		
		Senecio triangularis	arrow-leaf groundsel	282		
		Trollius laxus	American globeflower	85		
			Total	**1,895**	**2.6**	**0**
Total	**2.82**			**35,622**	**44**	**36**

Vegetation Planting Sequence
All vegetation will be planted when spring groundwater monitoring is complete, after any final topographic adjustments are made and as soon as plants are available from the supplier. If plugs cannot be planted by August 15 they will be planted the following spring as soon as snowmelt and other conditions allow access. Seed will most likely be applied by hydroseeding with a mulch and tackifier included to prevent erosion and seed loss. Supplemental irrigation may be supplied if necessary to keep the seedbed moist and increase germination success. Further irrigation may be supplied to ensure first-year survival especially if precipitation is below average.

Exotic Vegetation and Noxious Weeds
Exotic plant invasion is a potential problem at all revegetation sites. **Appendix E** lists all exotic plants considered noxious weeds that require control under Montana law. Noxious weeds will be controlled throughout the monitoring period according to state law.

Other species that exist at the golf course are viewed by the agencies as less desirable wetland plants. These are cattail (*Typha latifolia*), reed canarygrass (*Phalaris arundinacea*), butter and eggs (*Linaria vulgaris*), smooth brome (*Bromus inermis*), orchardgrass (*Dactylis glomerata*), Kentucky bluegrass (*Poa pratensis*) and timothy (*Phleum pretense*). These plants are present in wetland areas throughout the golf course and are more likely to invade restoration sites if the restoration sites are not aggressively revegetated with desirable species. These plants will not be seeded or planted in restored wetlands and their presence will be controlled throughout the monitoring period in wetland restoration areas to levels equivalent to reference areas. Control methods will concentrate on mechanical cutting or removal. Chemical herbicides may be used if necessary to control larger infestations.

Vegetation Restoration Activities Completed in 2002-2003
Seed was collected in 2002 for the species designated for seed collection in **Table 2**. Sufficient seed was collected for all golf course restoration areas included in this report. Seed was collected by botanists and wetland professionals skilled at plant identification. All seed was dried and cleaned of excess plant materials, and has been stored in a freezer at approximately 20° F since cleaning. This cold storage kills insect pests and provides the cold temperature stratification necessary to stimulate good germination.

Vegetation Restoration Activities Completed in 2003
Seed collected in 2002 was spread on restoration sites where YMC believed topographic adjustments were complete. However, seed was not spread until late May after most wetland surface soils had dried out due to the early snowmelt. No supplemental irrigation was applied. Rainfall during the summer of 2003 was below average (almost non-existent) and temperatures were above average.

Seed was again collected in 2003 for species designated for seed collection in **Table 2**. Seed was collected by botanists and wetland professionals skilled at plant identification. All seed was dried and cleaned of excess plant materials, and has been stored in a freezer at approximately 20° F since cleaning. This cold storage kills insect pests and provides the cold temperature

stratification necessary to stimulate good germination. Sufficient seed was collected for all golf course restoration areas included in this report and processed as described above. Seed to be planted in 2004 will follow protocols described above under the heading "Vegetation Planting Sequence".

3.2.5 Erosion Control

Erosion control measures during wetland restoration construction will conform to state law and regulation. This will be accomplished by amendments to the existing state stormwater authorizations and erosion control plan applicable to the golf course. Each wetland area will be evaluated during topographic adjustment and appropriate erosion control methods installed to prevent impacts to wetlands and waters of the U.S. from the restoration work.

3.2.6 Oversight

Specialists will be present as needed during wetland restoration to evaluate specific activities and ensure goals are met. **Table 4** shows the specialists and the tasks for which they will be responsible.

Table 4: ***Oversight Personnel***

Specialist	Oversight Task
Hydrologist	• Stream channel restoration
Botanist/Revegetation Specialist	• Seed collection and planting • Planting and transplanting trees • Planting plugs
Soil Scientist	• Excavation and topographic adjustment
Oversight Contractor	• General oversight as provided in the consent decree

3.3 Success Criteria and Monitoring

3.3.1 Success Criteria

Restoration/mitigation will be considered successful in this project if the total acreage of each restored wetland site meets COE wetland criteria for hydrology, soils and vegetation, each site meets the vegetation percentage site criteria below, and each site meets noxious weed criteria.

Hydrologic Success will be achieved if wetland hydrology is present within each restoration site sufficient to maintain hydric soils and support wetland vegetation. Hydrologic success will also require that constructed channels be stable in wetlands that include channel reconstruction as described below.

Soil Success will be achieved if hydric soil conditions are present or appear to be forming and the soil is sufficiently stable to prevent erosion. Dark surface layers, reduced subsoil colors, and mottles are the most likely hydric soil indicators that will develop. Since hydric soil features may require long periods to form in this environment, a lack of distinctive hydric soil features will not be considered a failure if hydrologic and vegetation success is achieved.

Vegetation Success will be achieved if wetland vegetation is dominant across each restoration site according to COE wetland criteria and:

- canopy coverage of all species meet the following goals:
  - 1st year after initial planting 25%
  - 2nd year after initial planting 50%
  - 3rd year after initial planting 75%
  - 4th year after initial planting 80%
  - 5th year after initial planting 80%
- noxious weeds are controlled to levels that are authorized by state law and the other undesired exotic plants have a canopy cover equal to or less than those occurring at reference sites.

The following concept of "dominance", as defined in the 1987 Army COE wetland delineation manual, will be employed during future routine wetland determinations in restored wetlands and reference areas: "*Subjectively determine the dominant species by estimating those having the largest relative basal area (woody overstory), greatest height (woody understory), greatest percentage of aerial cover (herbaceous understory), and/or greatest number of stems (woody vines).*"

Channel Restoration Success will be evaluated in terms of revegetation success and bank stability success. Revegetation will be considered successful if noxious weeds are controlled to levels that are authorized by state law and the canopy coverage of all plants meet these criteria:

1st year after initial planting 25%
2nd year after initial planting 50%
3rd year after initial planting 75%
4th year after initial planting 80%
5th year after initial planting 80%

Bank stability success will be evaluated by identifying reference sites along adjacent, undisturbed portions of the channel. The percentage of eroding channel will be evaluated for both restoration channels and reference channels. For this purpose "eroding bank" will be defined as any bank greater than two feet in length that is more than 50% bare mineral soil and has no roots, surface vegetation, or other stabilizing structure (e.g. rock, woody debris) to inhibit erosion. Bank stability success will be achieved according to the following criteria:

Year 1	following restoration – No criteria
Year 2	following restoration – less than 50% of banks are unstable or channel is within 5% of the reference channel
Year 3	following restoration – less than 35% of banks are unstable or channel is within 5% of the reference channel
Years 4&5	following restoration – less than 25% of banks are unstable or channel is within 5% of the reference channel

3.3.2 Monitoring

This section describes hydrologic, soil and vegetation monitoring at representative restoration sites and at the mitigation site. Reporting requirements for both the construction period and the five-year monitoring period are described in **Section 5.0 - Reporting**.

Detailed Wetland Monitoring
Detailed wetland monitoring will be conducted on the wetland mitigation site and on all wetland restoration sites and reference wetlands. Army Corps Routine Wetland Determination Forms will be completed annually on all detailed wetland monitoring sites. Forms will be completed in late July or early August when vegetation has fully developed. Two to four permanent photo points will be established depending on site size to illustrate typical conditions. These permanent photo points will be marked on the site photo and metal stakes installed so the top is at ground level and can be re-located using a metal detector. If safety concerns allow, short wooden stakes may also be installed for easier relocation. Photo points will have GPS coordinates recorded using a resource grade GPS unit. Dated photos will also be taken from each end of vegetation transects looking back along each transect. Additional dated photos will be taken as needed to depict problems or deficiencies if performance standards are not being met. All monitoring components will be identified on individual site plans similar to those presented in **Figure 3** of this restoration plan. Performance standards that are not being met will be described and contingencies identified that may be used to meet standards. Additional data collection is described below. Detailed monitoring will occur for three years. If performance criteria are met in three years, subsequent monitoring will be reduced to the "routine wetland monitoring" procedures discussed below. If performance criteria are not met in three years, detailed monitoring will continue until they are met.

Detailed Hydrologic Monitoring
Hydrologic monitoring will include completing Army Corps Routine Wetland Determination Forms for each site once each year and additional data collection as described below.

In the first complete year of groundwater monitoring, monitoring will occur every two weeks throughout the growing season (May-October unless snow depths or other weather conditions prevent access). In subsequent years, groundwater monitoring will occur every two weeks during the peak period of wetland hydrology (June-July unless snow depths or other weather conditions prevent access). If wetland soil and vegetation success is not achieved, these hydrologic data will also be used in identifying necessary corrective actions.

Groundwater will be monitored by installing 2-4 monitoring wells per site to a depth of 3 feet consisting of 0.020 factory slotted 1-inch PVC. PVC will be cut at 2 inches above ground level. Many of these wells already have been installed as noted in the individual site descriptions in Section 4. Measurements will be reported as depth to water below the ground surface. If soil conditions do not allow hand installation, a Geoprobe, backhoe or other mechanical monitoring well installation equipment will be used. A static water level tape will be used to measure depth to groundwater.

Detailed Soil Monitoring
Detailed soil monitoring will include completing Army Corps Routine Wetland Determination Forms for each site once each year, likely during the July or August monitoring of vegetation. A minimum of five soil observations per site per visit will be made to directly verify hydric soil conditions, or to document hydric soil indicators such as dark surface layers, gleyed colors, and mottles. One observation will be described on the Army Corps form and notes on variation between the five observations will be described in the notes section.

Detailed Vegetation Monitoring
Vegetation monitoring will include completing Army Corps Routine Wetland Determination Forms for each site once each year and additional data collection described below.

Detailed vegetation data will be collected in late July or early August when the majority of wetland species are identifiable and have reached maximum canopy coverage. Dominant vegetation will be recorded on Army Corps Routine Wetland Determination forms according to Corps procedures. A complete species list will also be compiled at each site.

A permanent transect will be installed at each restoration and reference site that represents the range of topographic, hydrologic and soil conditions present. Transect ends will be marked with metal stakes installed so the top is at ground level and can be re-located using a metal detector. Transect ends will have GPS coordinates recorded using a resource grade GPS unit. Twenty micro-plots ($1/10^{th}$ meter) will be located along each transect centered at consistent intervals using a tape. The interval may be adjusted for individual sites depending on their size. Micro-plots will be relocated at the same spot in subsequent years. Coverage will be recorded at micro-plots for each individual plant species as well as for erosion control fabric, bare soil, rock and litter/wood. Average coverage will be calculated for all plants, for individual species and for erosion control fabric, bare soil, rock and litter/wood. Vertical dated photographs will be taken of the 1^{st}, 10^{th} and 20^{th} microplot frames along each transect to illustrate vegetation success and canopy coverage.

Routine Wetland Monitoring
Routine wetland monitoring will be conducted on sites after completion of the detailed monitoring period. Army Corps Routine Wetland Determination Forms will be completed annually in late July or early August when vegetation has fully developed. Two to four permanent photo points will be established depending on site size to illustrate typical conditions. These permanent photo points will be marked and recorded as described above. Notes will be recorded on the Corps form summarizing site conditions and noting any potential problems in meeting wetland criteria. All photos will be dated.

Detailed Channel Monitoring
Detailed stream channel monitoring will occur at Site G1 as noted on **Table 5**. Reference site RG1 will be used as the reference channel. Photo points will be established representing typical conditions along each channel (minimum of one per 100 feet of restored or reference channel). Once each year, during July or August, photo points will be marked and recorded as described above under wetland monitoring. Photo dates will be provided. At each photo point, channel vegetation will be monitored by ocular estimates of total plant cover, plant cover by species and

cover of erosion control fabric, bare soil, rock and litter/wood. The length of eroding bank will be recorded for the entire length of each restored channel and reference channel. Recommendations for corrective action will be recorded if problems are noted. If performance criteria are met in three years, subsequent monitoring will be reduced to the "routine channel monitoring" procedures discussed below.

Routine Channel Monitoring
For routine channel monitoring, two to four photo points will be established representing typical conditions along the restored channel. Photo points will be marked and recorded as described above under routine wetland monitoring. Dated photos will be taken in a manner that vegetation success can be evaluated. Notes will be taken on any problems observed with channel restoration.

3.4 Contingency Plans

Examples of contingency plans for wetland hydrology, soil and vegetation concerns are presented below. Other contingency plans may be required by EPA to address specific issues as restoration proceeds. If any modification or augmentation to restoration efforts is required, YMC will prepare a written contingency plan for approval by the oversight agencies before implementation. If monitoring during the first two years suggests that modification may be needed, additional site manipulation will be implemented to increase the chance of success.

Hydrologic Contingency Plans: The most likely reason for not meeting wetland hydrologic criteria is a lack of sufficient water. Should this occur, additional water might be supplied by engineering or other solutions. If constructed stream channels become unstable, they may be stabilized by enlarging the channel or by increasing bank stability with rock, fabric, woody debris, or mature plant materials. Individual stability problems would be solved by site-specific designs.

Soil Contingency Plans: Soil contingency planning will not be required if hydrology and vegetation criteria are being met. The most likely reason for not meeting wetland soil criteria would relate to a lack of water with similar contingency plans as described under Hydrologic Contingency Plans. If soil performance standards related to erosion are not met, erosion control methods will be implemented to reduce water concentration and protect exposed soil. These methods may include among others water spreaders, erosion control fabric, mulch, or additional vegetation seeding/plantings. If a lack of organic matter appears to restrict vegetation development, organic matter can be added as compost, imported soil or other forms.

Vegetation Contingency Plans: The most likely reasons for not meeting wetland vegetation criteria would include a lack of water, problems with seed germination and establishment, and problems with plant survival. Hydrologic conditions may need to be altered as described above or areas may need to be re-seeded or re-planted to meet vegetation performance criteria.

If performance standards related to noxious weeds or other exotic plants are not met, control methods will be used to meet state law and other performance criteria. Manual or mechanical removal will be used for small infestations. Chemical control may be used if infestations within

restoration areas become large. Control methods may also be used on adjacent upland areas if necessary to prevent spread into restoration sites. If success criteria for wetland plant diversity and canopy coverage are not met, several contingency methods may be used including, but not limited to:

- Planting additional seed purchased from reputable sources (grasses only).
- Collecting seed from the golf course area for propagation in a greenhouse and planting plugs the following spring (sedges, rushes, forbs and shrubs).
- Transplanting wetland plants from adjacent wetland areas (no more than 1% of any wetland source area would be disturbed).
- Planting mature plants purchased from reputable sources.

Activities conducted to implement the restoration and mitigation plans, including contingency plans, will terminate when success criteria are met.

4.0 SITE-SPECIFIC RESTORATION PLANS

4.1 Restoration Site G1

4.1.1 Site Description

This site includes a stream within an area classified as a Riverine Wetland type. The adjacent undisturbed wetlands are dominated by forbs, sedges, rushes and grasses with minor amounts of shrubs and trees. Some conifer trees were likely present along the fringe of these adjacent wetlands and on hummocks within these wetlands. Vegetation before disturbance was likely similar to Reference Wetland RG1 (see detailed vegetation description in **Appendix C**).

4.1.2 Description of Impacts

The G1 area is located on the eastern portion of Fairway #5 within a perennial stream corridor that is a high gradient channel typical of headwaters streams in the Rocky Mountains (**Appendix B - Photo 1**). Impacts occurred over approximately a 300 feet length of stream and adjacent wetland. The disturbance resulted from a cut to install a culvert (culvert no. GC034) and disturbed a 16,289 square-foot (0.37 acre) area (**Figure 3A-G1**). During the fall of 2003, the area was excavated to the original soil surface, the culvert was removed, the stream channel was reconstructed and the stream channel portion of site G1 was revegetated. Channel and revegetation work conducted during the fall of 2003 includes an area of 5414 square feet (0.124 acres). The remaining revegetation work at G1 includes an area of 10,875 square feet (0.25 acres).

4.1.3 Restoration Objectives – Stream Channel

The objective of the channel restoration design was to recreate a naturally dynamic fluvial system. There is no provision, therefore, for hard bank revetments that would ensure channel stability over the entire length of restored channel over the long term. Rather, this design called for stabilizing the banks with biodegradable erosion control fabric and stabilizing the bed

vertically with the use of rock in natural configurations and spacing. The risk of this type of natural channel design is that certain flow conditions may destabilize the channel (either vertically or laterally) if they occur prior to the establishment of mature vegetation. It was our intent to provide enough near-term stability to ensure the integrity of the restoration efforts. However, it should be noted that natural channel design principles by definition do not include engineering assurances regarding stability under certain flow conditions.

4.1.4 Restoration Design – Stream Channel

Reference Conditions
Reference conditions are a step-pool channel form with the steps serving as grade control. Step-pool channels are characterized by an accumulation of boulders into organized discrete transverse ribs spanning the channel. The steps within the reference reaches for this project are formed by either boulders or large woody debris.

Channel Reconstruction
A hydrologist was present during channel construction in 2003 and made field modifications as necessary to meet restoration objectives. The channel in G1 has now been reconstructed to emulate, as closely as possible, reference conditions. Wood was incorporated into the banks and buried for stability rather than overlaid loosely over the channel. This wood was placed at locations and configurations based on field conditions by the oversight hydrologist. A minimum rock diameter (intermediate axis) of 1.0 foot was used for all channel slopes throughout G1. This was designed to provide some margin of safety that the channel will not degrade catastrophically. Some smaller rocks were mixed into the substrate material to better match reference conditions and to preclude dewatering of the channel due to seepage through the channel substrate. Anchor boulders approximately 2.5 feet in diameter (intermediate axis) were also used in channel construction. **Figures 3A-G1** through **3D-G1** illustrates the design details for the completed restoration of this site.

Revegetation
Revegetation was completed for the channel restoration portion of this site during channel reconstruction in the fall 2003. The revegetated areas included 5414 square feet (0.124 acres) of site G1. Channel revegetation at site G1 included seeding with native grass species and transplanting sod and conifer trees. Wetland sod of beaked sedge (*Carex rostrata*) was mixed with a small amount of topsoil and placed under the erosion control fabric used to reconstruct the channel banks (NA Green C350 – **Figure 3C-G1**). This wetland sod was obtained from an adjacent property at a similar elevation and contains no weed species. Encapsulated sod was approximately 1 foot deep and 4 feet wide. Purchased grass seed from reputable dealer consisting of the species bluejoint reedgrass was hand broadcasted at a rate of approximately 15 pounds per acre. Seeds were spread on top of the sod/topsoil prior to completion of the fabric wrap. Eight 6 foot tall conifer trees (subalpine fir) were transplanted along the outer edges of the channel restoration area. The remaining revegetation work at G1 includes an area of 10,825 square feet (0.249 acres).

4.1.5 Restoration Design – Adjacent Wetland Area

The objectives for restoring wetlands adjacent to the stream channel are to remove fill, expose the original soil surface, re-establish wetland vegetation and meet all wetland criteria and performance standards. Specific steps to be taken to restore Site G1 adjacent wetlands include:

4.1.5.1 Topography

- Topographic adjustment was performed in 2003 at the same time as channel reconstruction. Further topographic adjustment may occur following spring 2004 water level monitoring.

4.1.5.2 Vegetation

- Re-establish wetland vegetation as described in **Section 3.2.4**, illustrated on **Figure 3A-G1** for the portion of the site not revegetated as part of channel reconstruction in 2003. The remaining revegetation work at G1 includes an area of 10,875 square feet (0.25 acres).
- Compare vegetation with performance standards and take action if needed to alter vegetation.

4.1.5.3 Hydrology

- Re-establish wetland hydrology as described in **Section 3.2.2**. Monitoring wells were installed in the fall of 2003 and monitored until snow prevented access. Wells will be monitored again in 2004.
- Add logs to promote even water distribution across the restored site.

4.1.5.4 Monitoring

Implement the monitoring plan described in **Section 3.3.2** including surface water monitoring along reconstructed stream channels

4.2 Restoration Site G2

4.2.1 Site Description

This site includes a stream within an area classified as a Riverine Wetland type. The adjacent undisturbed wetlands are dominated by forbs, sedges, rushes and grasses with minor amounts of shrubs and trees. Conifer trees are present along the fringe of these wetlands and on hummocks within these wetlands. Vegetation before disturbance was likely similar to Reference Wetland RG2G (see **Appendix B - Photo 11** and detailed vegetation description in **Appendix C**).

4.2.2 Description of Impacts

The G2 site is located upstream (south) of G1 on Fairway #8. The entire site is approximately 4,533 square feet (0.10 acre), of which 529 square feet (0.01 acre) required topographic adjustment and revegetation. Most of the impacts appeared to be from equipment driving through the wetland and from cutting the taller vegetation (trees and shrubs). YMC believes that most of the area does not require topographic adjustment since the topography was not

significantly altered and it is still dominated by wetland plants with small trees on hummocks (**Appendix B - Photo 2**). The intermittent stream channel though this wetland appeared stable. A small amount of fill existed along the eastern edge of this restoration site as illustrated in **Photo 2**. This fill was removed in the fall of 2002.

4.2.3 Restoration Objectives

The objectives for this site were to remove certain identified fill (completed in 2002) and expose the original soil surface, re-establish wetland vegetation (ongoing) and meet all wetland criteria and performance standards. Due to the small impacts and low stream gradient, the plan does not contemplate any channel reconstruction similar to that proposed at site G-1. The specific tasks for restoration of G2 include:

4.2.3.1 Topography

- Very little topographic adjustment may be required at this site. A small amount of fill was removed along the northeast border in 2002 (**Appendix B - Photo 2**). Further topographic adjustment may occur following spring 2004 water level monitoring.

4.2.3.2 Vegetation

- Re-establish wetland vegetation as described in **Section 3.2.4** and shown on **Figure 3A-G2**. Note that only a portion of this site (529 sq. ft. - 0.01 ac.) requires revegetation.
- Compare vegetation with performance standards and then take action if needed to alter vegetation.
- Note that most of the site now has almost complete coverage of wetland plants and the disturbed area shows evidence of wetland plants emerging, especially field horsetails. Vegetation seeding and planting will only occur on a very small portion of this site.

4.2.3.3 Hydrology

- Re-establish wetland hydrology as described in **Section 3.2.2**. Monitoring wells were installed in the fall of 2003 and monitored until snow prevented access. Wells will be monitored again in 2004.

4.2.3.4 Monitoring

- Implement the monitoring plan described in **Section 3.3.2**.

4.3 Restoration Site G3SW

4.3.1 Site Description

G3SW is approximately 80 feet in length and is classified as a Slope Wetland type. The source of hydrology is up-gradient seeps. Vegetation before disturbance was likely similar to Reference Wetland RGG2G3G4 (see detailed vegetation description in **Appendix C**).

4.3.2 Description of Impacts

Area G3SW was disturbed by excavation over approximately half of the site and filling over the other half. Approximately 7,464 square-feet (0.17 acre) were impacted at this site.

4.3.3 Restoration Objectives

The objectives for this site are to remove fill to expose the original soil surface, add additional soil and regrade where necessary, re-establish wetland vegetation and meet all wetland criteria and performance standards. Specific restoration steps for Wetland G3SW include:

4.3.3.1 Topography

- Topographic adjustment was performed in 2002 (see **Appendix G – Restoration Progress Reports**). Wetland soils now constitute the exposed surface and hydrology has returned at this location. Further topographic adjustment may occur following spring 2004 water level monitoring.
- Hole #5 has been redesigned to avoid wetland impacts.

4.3.3.2 Vegetation

- Re-establish wetland vegetation as described in **Section 3.2.4** and as illustrated on **Figure 3A-G3SW**.
- Compare vegetation with performance standards and take action if needed to alter vegetation.

4.4.3.3 Hydrology

- Restoration of pre-disturbance topography has exposed the pre-existing groundwater seep, thereby restoring surface hydrology to the site.
- Re-establish wetland hydrology as described in **Section 3.2.2**. Monitoring wells were installed in the fall of 2003 and monitored until snow prevented access. Wells will be monitored again in 2004.
- Add logs to promote even water distribution across the restored site.

4.3.3.3 Monitoring

- Implement the monitoring plan described in **Section 3.3.2**.

4.4 Restoration Site G3NE

4.4.1 Site Description

G3NE is approximately 120 feet in length and was a Slope Wetland type prior to disturbance. This wetland was located within a clearcut meadow; the clearcut occurred prior to the onset of the Golf Course project. In general, G3NE is a small area downslope and separated from G3SW by upland. The source of hydrology appears to be groundwater seepage. There was no evidence of surface flow during wetland delineation fieldwork in 1999 (Wetlands West 2000). Vegetation before disturbance was likely similar to Reference Wetland RG2G3G4 (see detailed vegetation description in **Appendix C**).

4.4.2 Description of Impacts

Approximately 4,403 square-feet (0.10 acre) were impacted at area G3NE.

4.4.3 Restoration Objectives

The specific steps for restoration of G3NE include:

4.4.3.1 Topography

- Topographic adjustment was performed in 2002 (see **Appendix G – Restoration Progress Reports**). Further topographic adjustment may occur following spring 2004 water level monitoring.
- Hole #5 has been redesigned to avoid wetland impacts.

4.4.3.2 Vegetation

- Re-establish wetland vegetation as described in **Section 3.2.4** and as illustrated on **Figure 3A-G3NE**.
- Compare vegetation with performance standards and take action if needed to alter vegetation.

4.4.3.3 Hydrology

- Topographic adjustments are expected to expose the pre-existing groundwater seep, thereby restoring surface hydrology to the site.
- Re-establish wetland hydrology as described in **Section 3.2.2**. Monitoring wells were installed in the fall of 2003 and monitored until snow prevented access. Wells will be monitored again in 2004.
- Add logs to promote even water distribution across the restored site.

4.4.3.4 Monitoring

- Implement the monitoring plan described in **Section 3.3.2**.

4.5 Restoration Site G4

4.5.1 Site Description

This site is classified as a Slope Wetland type. Pre-disturbance, this area was an entangled area of fallen trees left from a past timber harvest. The source of hydrology appears to be groundwater seepage. Vegetation before disturbance was likely similar to Reference Wetland RG2G4 (see **Appendix B - Photo 11** and detailed vegetation description in **Appendix C**).

4.5.2 Description of Impacts

The G4 site on Fairway #8 is located upgradient (south) of G-3SW. Impacts occurred over a length of approximately 110 feet. Most of the impacts appeared to be from equipment driving through the wetland and from cutting the taller vegetation (trees and shrubs). Most of the area is still dominated by wetland plants and small trees and may not require topographic adjustment (**Appendix B - Photo 5**). A small amount of fill needed to be removed along the eastern edge of this restoration site as illustrated in **Photo 5**. The total area of this site is 8,143 square feet (0.19 acre) of which 2,562 square feet (0.06 acre) require topographic adjustment and revegetation.

4.5.3 Restoration Objectives

The objectives for this site are to remove fill and expose the original soil surface (completed), re-establish wetland vegetation (ongoing) and meet all wetland criteria and performance standards. The specific tasks for restoration of G4 include:

4.5.3.1 Topography

- Very little topographic adjustment may be required at this site. A small amount of fill was removed along the northeast border in 2002 (**Appendix G – Restoration Progress Reports**). Further topographic adjustment may occur following spring 2004 water level monitoring.

4.5.3.2 Vegetation

- Re-establish wetland vegetation as described in **Section 3.2.4** and as illustrated on **Figure 3A-G4**. Note that only a portion of this site (2562 sq. ft. - 0.06 ac.) requires revegetation.
- Compare vegetation with performance standards and reference wetland area and take action if needed to alter vegetation. If vegetation meets performance standards, no further action will be necessary.

4.5.3.3 Hydrology

- Re-establish wetland hydrology as described in **Section 3.2.2**. Monitoring wells were installed in the fall of 2003 and monitored until snow prevented access. Wells will be monitored again in 2004.

4.5.3.4 Monitoring

- Implement the monitoring plan described in **Section 3.3.2**.

4.6 Restoration Site G5/114

4.6.1 Site Description

Site G5 is located on the northwest end of Fairway #5 and is a Slope Wetland type. This site has been combined with the area of EPA Site 114 (see **Figure 3A-G5/114**) and they are discussed together in text, tables and figures. The source of hydrology appears to be groundwater seepage. Vegetation before disturbance was likely similar to Reference Wetland RG5 (see **Appendix B - Photo 12** and detailed vegetation description in **Appendix C**).

4.6.2 Description of Impacts

The area of G5 was impacted by the excavation and filling required to install a culvert (Culvert No. GC036). This culvert is installed just north of the wetland area but a small amount of fill from the culvert excavation was placed in the adjacent wetland. The area of G5 was originally 718 square feet (0.02 acres) and the area of EPA 114 is 3095 square feet (0.07 acres). As a result of this addition, G5 is now 3813 square feet (0.09 acres).

4.6.3 Restoration Objectives

The objectives for this site are to remove fill and adjust elevation to the original soil surface then re-establish wetland vegetation and meet all wetland criteria and performance standards. No topographic work occurred at this site in 2002 or 2003. The specific tasks for restoration of G5 (and 114) include:

4.6.3.1 Topography

- YMC believes that very little topographic adjustment is required at this site. The culvert will be removed at G5. A small amount of fill will be removed along the northwest border of G5 (**Appendix B - Photo 6**). Topography will be adjusted at 114 in a manner similar to **Figures 2a** and **2b**.
- Hole #5 has been redesigned to avoid additional wetland impacts.

4.6.3.2 Vegetation

- Re-establish wetland vegetation as described in **Section 3.2.4** and as illustrated on **Figure 3A-G5/114**.
- Compare vegetation with performance standards and take action if needed to alter vegetation.

4.6.3.3 Hydrology

- Re-establish wetland hydrology as described in **Section 3.2.2**.
- Add logs to promote even water distribution across the restored site.

4.6.3.4 Monitoring

- Implement the monitoring plan described in **Section 3.3.2**.

4.7 Restoration Site G6

4.7.1 Site Description

Site G6 is located in the northwest corner of the golf course between holes #12 and #13 and is a Slope Wetland type. The site was clearcut during historic logging activity, prior to golf course construction. The impacted area is along the northeast edge of the wetland. The source of hydrology appears to be a seep immediately uphill and southeast of G6. Vegetation before disturbance was likely similar to Reference Wetland RG6 (see **Appendix B - Photo 13** and detailed vegetation description in **Appendix C**).

4.7.2 Description of Impacts

The site was impacted by placement of approximately 12 cubic yards of fill over a 140 square-foot (0.003 acre) area.

4.7.3 Restoration Objectives

The restoration objectives for this site are to restore topography (initiated), hydrology, and vegetation to pre-disturbance conditions. This will be accomplished by the removal of fill to reestablish pre-disturbance contours and conditions. The specific steps in the restoration of Wetland G6 include:

4.7.3.1 Topography

- Very little topographic adjustment may be required at this site. A small amount of fill was removed along the northwest border in 2002. (**Appendix B - Photo 7** and **Appendix G – Restoration Progress Reports**). Further topographic adjustment may occur following spring 2004 water level monitoring.

4.7.3.2 Vegetation

- Re-establish wetland vegetation as described in **Section 3.2.4** and as illustrated on **Figure 3A-G6**.
- Compare vegetation with performance standards and take action if needed to alter vegetation.

4.7.3.3 Hydrology

- Re-establish wetland hydrology as described in **Section 3.2.2**. Monitoring wells were installed in the fall of 2003 and monitored until snow prevented access. Wells will be monitored again in 2004.

4.7.3.4 Monitoring

- Implement the monitoring plan described in **Section 3.3.2**.

4.8 Restoration Site G7

4.8.1 Site Description

Site G7 is located on the southwest portion of Fairway #16 and is classified as a Slope Wetland type with very little forest cover due to historic logging that occurred prior to golf course construction. The source of hydrology appears to be a seep which flowed in a small, vegetated channel (ditch) along the uphill side of a historic logging road. The wetland widened into a meadow on the northeast end. Vegetation before disturbance was likely similar to Reference Wetland RG7 (see detailed vegetation description in **Appendix C**).

4.8.2 Description of Impacts

The area of impact at this site resulting from fill was approximately 12,832 square-feet (0.29 acre).

4.8.3 Restoration Objectives

The restoration objectives for this site are to restore topography (initiated), hydrology, and vegetation to pre-disturbance conditions. The topographic adjustment was accomplished mainly by the removal of fill (and a small amount of added soil) to reestablish pre-disturbance contours and conditions. The specific steps in the restoration of Wetland G7 include:

4.8.3.1 Topography

- Topographic adjustment was performed in 2002 (see **Appendix G – Restoration Progress Reports**). Further topographic adjustment may occur following spring 2004 water level monitoring.
- Hole #16 has been redesigned to avoid restored wetlands.

4.8.3.2 Vegetation

- Re-establish wetland vegetation as described in **Section 3.2.4** and as illustrated on **Figure 3A-G7**.
- Compare vegetation with performance standards and take action if needed to alter vegetation.

4.8.3.3 Hydrology

- Re-establish wetland hydrology as described in **Section 3.2.2**. Monitoring wells were installed in the fall of 2003 and monitored until snow prevented access. Wells will be monitored again in 2004.
- Add logs to promote even water distribution across the restored site.

4.8.3.4 Monitoring

- Implement the monitoring plan described in **Section 3.3.2**.

4.9 Restoration Site G8/111

4.9.1 Site Description

Site G8 is located between Fairways #16 and #15 and is classified as a Slope Wetland type. This was noted to be a marginal wetland area when delineated in 1999 (Wetlands West 2000) with very little evidence of saturation to the surface. This site has been combined with EPA Site 111 and they are discussed together in text, tables and figures. The source of hydrology appears to be groundwater seepage. Vegetation before disturbance was likely similar to Reference Wetland RG8G9G10G12 (see detailed vegetation description in **Appendix C**).

4.9.2 Description of Impacts

Original site G8 was excavated (cut) over an approximate 1,983 square-foot area (0.05 acre). Site 111 was also affected by golf course construction and is approximately 7,794 square-feet (0.18 acre) in size. As a result of the addition of site 111, G8 is now 9,777 square feet (0.23 acres).

4.9.3 Restoration Objectives

The restoration objectives for this site are to restore topography, hydrology, and vegetation to pre-disturbance conditions. Topographic adjustment was performed at G8 in 2002 by the addition of soil to reestablish pre-disturbance contours and conditions. Additional topographic adjustment may be required following additional groundwater monitoring in spring 2004. The specific steps in the restoration of Wetland G8 and 111 include:

4.9.3.1 Topography

- Topographic adjustment was performed at G8 in 2002. Further topographic adjustment may occur following spring 2004 water level monitoring. Topography will be adjusted at 111 in a manner similar to **Figures 2a** and **2b** and **Figure 3A-G8/111**.

4.9.3.2 Vegetation

- Re-establish wetland vegetation as described in **Section 3.2.4** and as illustrated on **Figure 3A-G8**.
- Compare vegetation with performance standards and take action if needed to alter vegetation.

4.9.3.3 Hydrology

- Re-establish wetland hydrology as described in **Section 3.2.2**. Monitoring wells were installed in the fall of 2003 and monitored until snow prevented access. Wells will be monitored again in 2004.
- Add logs to promote even water distribution across the restored site.

4.9.3.4 Monitoring

- Implement the monitoring plan described in **Section 3.3.2**.

4.10 Restoration Site G9

4.10.1 Site Description

Site G9 is located within the practice range and is classified as a Slope Wetland type (**Appendix B - Photo 9**). The source of hydrology appears to be a spring or seep at the upper end of the wetland. Vegetation before disturbance was likely similar to Reference Wetland RG9G12 (see detailed vegetation description in **Appendix C**).

4.10.2 Description of Impacts

The total area of this site is 717 square feet (0.02 acre) of which 193 square feet (0.004 acre) required fill removal and revegetation.

4.10.3 Restoration Objectives

The restoration objectives for this site are to restore topography (initiated), hydrology, and vegetation to pre-disturbance conditions. Topographic adjustment was completed in 2002 by the removal of fill to reestablish pre-disturbance contours and conditions. The specific steps in the restoration of Wetland G9 include:

4.10.3.1 Topography

- Topographic adjustment was performed in 2002 (see **Appendix G – Restoration Progress Reports**). Further topographic adjustment may occur following spring 2004 water level monitoring.

4.10.3.2 Vegetation

- Re-establish wetland vegetation as described in **Section 3.2.4** and as illustrated on **Figure 3A-G9**.
- Compare vegetation with performance standards and take action if needed to alter vegetation.

4.10.3.3 Hydrology

- Re-establish wetland hydrology as described in **Section 3.2.2**. Monitoring wells were installed in the fall of 2003 and monitored until snow prevented access. Wells will be monitored again in 2004.

4.10.3.4 Monitoring

- Implement the monitoring plan described in **Section 3.3.2**.

4.11 Restoration Site G10/103/103a

4.11.1 Site Description

Site G10 is located at approximately the mid-point of Fairway #15 spanning approximately 575 feet north and south of the fairway centerline. This site has been classified as a Slope Wetland type. The source of hydrology appears to be seepage from uphill wetlands. Vegetation before disturbance was likely similar to Reference Wetland RG8G9G10G12 (see detailed vegetation description in **Appendix C**). Due to their immediate proximity and similar conditions, this site has been combined with sites 103 and 103a. Figures and treatments have been developed that cover all these sites together. Mitigation area GC-M (see below) is adjacent to G10.

4.11.2 Description of Impacts

Site G10 was disturbed by excavation across about two-thirds of the site and filling with approximately 2,183 cubic yards of fill over about one-third of the site. Site GC-M is an upland area located between these wetland sites that will be converted into wetland as a mitigation site. The area of original site G10 is 36,451 square feet (0.84 acres). The area of Site 103 is 15,835 square feet (0.36 acres). The area of Site 103a is 7,818 square feet (0.18 acres). As a result of the addition, G10 is now 60,104 square feet (1.38 acres). The area of Site GC-M is 6,712 square feet (0.15 acres).

4.11.3 Restoration Objectives

The objectives for this combined site are to remove fill to expose the original soil surface, add additional soil where necessary, re-establish wetland vegetation and meet all wetland criteria and performance standards. Initial topographic adjustment was performed at original site G10 in 2002 by the removal of fill and the additions of soil needed to reestablish pre-disturbance contours and conditions. Further topographic adjustment may occur in 2004 following additional well monitoring. Similar topographic adjustments may also be made at 103 and 103a if well monitoring indicates a need. The specific steps in restoration include:

4.11.3.1 Topography

- Topographic adjustment was performed at the original site G10 in 2002 by removing fill to expose the original soil surface and adding additional soil where necessary (see **Appendix G – Restoration Progress Reports**). Further topographic adjustment may occur following spring 2004 water level monitoring. Similar topographic adjustments will be made at 103 and 103a. Final topographic adjustments will be made similar to that illustrated in **Figures 2a and 2b** and on **Figure 3A-G10/103/103a**.
- Hole #15 has been redesigned to avoid wetland impacts.

4.11.3.2 Vegetation

- Re-establish wetland vegetation as described in **Section 3.2.4** and as illustrated on **Figure 3A-G10/103/103a/GC-M**.
- Compare vegetation with performance standards and take action if needed to alter vegetation.

4.11.3.3 Hydrology

- Re-establish wetland hydrology as described in **Section 3.2.2**.
- Add logs to promote even water distribution across the restored site.

4.11.3.4 Monitoring

- Implement the monitoring plan described in **Section 3.3.2**.

4.12 Restoration Site G11

4.12.1 Site Description

Wetland G11 is located southwest of Fairway #10 and is approximately 175 feet in length. This site is classified as a Slope Wetland type. This wetland impact is not located within the forested portion of the wetland, but in a historically logged area or one that did not support tree growth as a result of soil saturation. The source of hydrology appears to be springs and seeps at the uphill edge of the wetland. Vegetation before disturbance was likely similar to Reference Wetland RG11 (see **Appendix B - Photo 14** and detailed vegetation description in **Appendix C**).

4.12.2 Description of Impacts

This site was disturbed by 161 cubic yards of fill placed over a 2,914 square-foot (0.07 acre) area (**Appendix B - Photo 10**).

4.12.3 Restoration Objectives

The restoration objectives for this site are to restore topography (initiated), hydrology, and vegetation to pre-disturbance conditions. Topographic adjustment was performed in 2002 by the removal of fill to reestablish pre-disturbance contours and conditions. The specific steps in the restoration of Wetland G11 include:

4.12.3.1 Topography

- Topographic adjustment was performed in 2002 (see **Appendix G – Restoration Progress Reports**). Further topographic adjustment may occur following spring 2004 water level monitoring.
- Remove topographic adjustments caused by construction -related vehicular traffic. This has been performed.

4.12.3.2 Vegetation

- Re-establish wetland vegetation as described in **Section 3.2.4** and as illustrated on **Figure 3A-G11**.
- Compare vegetation with performance standards and take action if needed to alter vegetation.

4.12.3.3 Hydrology

- Re-establish wetland hydrology as described in **Section 3.2.2**. Monitoring wells were installed in the fall of 2003 and monitored until snow prevented access. Wells will be monitored again in 2004.

4.12.3.4 Monitoring

- Implement the monitoring plan described in **Section 3.3.2**.

4.13 Restoration Site G12

4.13.1 Site Description

Site G12 is southwest of G11 on the practice range and is classified as a Slope Wetland type. This specific impact site is very similar to impacts at site G9. The source of hydrology appears to be a seep at the uphill edge of the wetland. Vegetation before disturbance was likely similar to Reference Wetland RG9G12 (see detailed vegetation description in **Appendix C**).

4.13.2 Description of Impacts

This site was impacted for a length of approximately 50 feet. It was impacted with approximately 62 cubic yards of fill over a 541 square-foot (0.01 acre) area.

4.13.3 Restoration Objectives

The restoration objectives for this site are to restore topography, hydrology, and vegetation to pre-disturbance conditions. This will be accomplished by the removal or addition of fill as is needed to reestablish pre-disturbance contours and conditions. The specific steps in the restoration of site G12 include:

4.13.3.1 Topography

- Pre-disturbance topography will be restored (see **Appendix D, Sheets A-70** to **A-71** for grading plan).
- Remove topographic adjustments caused by construction -related vehicular traffic.

4.13.3.2 Vegetation

- Re-establish wetland vegetation as described in **Section 3.2.4** and as illustrated on **Figure 3A-G12**.
- Compare vegetation with performance standards and take action if needed to alter vegetation.

4.13.3.3 Hydrology

- Re-establish wetland hydrology as described in **Section 3.2.2**.

4.13.3.4 Monitoring

- Implement the monitoring plan described in **Section 3.3.2**.

4.14 Mitigation Site GC-M

4.14.1 Site Description

Site GC-M is located at the south end of G10 adjacent to G10, 103 and 103a (**Appendix A** and **Figure 3C- GC-M**). Site GC-M encompasses the upland area located between the adjacent uphill wetland restoration areas 103 and the downhill wetland restoration area 103a and G10.

Due to their immediate proximity and similar conditions, the design of this site has been combined with sites G10, 103 and 103a. The area of site GC-M is 6,712 square feet (0.15 acres.) Figures and treatments have been developed that cover all these sites together.

4.14.2 Description of Impacts

Site GC-M is an upland area located between wetland sites G-10, 103 and 103a that will be converted into wetland as a mitigation site. Site GC-M was disturbed during golf course construction, but this area was determined to be in an upland area with no impacts to wetlands.

4.14.3 Mitigation Objectives

The objectives for this combined site are to adjust the soil surface and composition where necessary, establish hydrology and wetland vegetation and meet all wetland criteria and performance standards. Monitoring and reporting requirements will be the same as for the mitigation sites. The specific steps in constructing this mitigation site include:

4.14.3.1 Topography

- Adjust topography to promote wetland creation in a manner similar to the surrounding wetland restoration sites.
- Final topographic adjustments will be made similar to that illustrated in **Figures 2a and 2b** and on **Figure 3C-GC-M.**

4.14.3.2 Vegetation

- Establish wetland vegetation as described in **Section 3.2.4** and as illustrated on **Figure 3A-G10/103/103a/GC-M.**
- Compare vegetation with performance standards and then take action if needed to alter vegetation.

4.14.3.3 Hydrology

- Establish wetland hydrology by adjusting topography as described above and installing a water spreader in conjunction with adjacent wetland restoration sites as illustrated on **Figure 3A-G10/103/103a/GC-M.**
- Add logs to promote even water distribution across the restored site.

4.14.3.4 Monitoring

- Implement the monitoring plan described in **Section 3.3.2.**

5.0 REPORTING

5.1 Spring 2004 Monitoring Well Reporting

5.1.1 Initial Reports

Monitor well data from 2003 is presented in Appendix F. YMC will collect monitoring well data during 2004 (commencing in approximately late May through, as conditions allow, June 30) on a weekly basis and will provide EPA with copies of these data on a bi-weekly basis. A special report will be prepared and submitted to EPA by July 12, 2004 that will include final recommendations on topographic adjustments for golf course restoration/mitigation sites based on the monitoring well data.

5.1.2 Subsequent 2004 Groundwater Monitoring

Groundwater wells will be monitored every two weeks from June 30 through October 2004 as conditions allow.

5.2 Progress Updates

During the construction phase, updates will be provided to EPA on the 1st and 15th of each month covering the status of ongoing restoration and mitigation efforts. The form to be used to collect information for these routine updates is included in Appendix G. Reports will also include representative photographic documentation of restoration work as described above.

5.3 Annual Monitoring Reports

YMC will provide annual reports on the status of restoration/mitigation success by November 1 of each year. The monitoring period for each site are set forth in **Table 5**. Each report will reference:

- The project by the official numeric identifier issued by the EPA.
- The individual or company responsible for completing the monitoring.
- The individual or company responsible for compiling the report.
- Maps similar to those in **Figure 3** illustrating the restoration/mitigation sites and reference wetlands with transect locations, monitoring well locations, photo locations and other spatial information.
- Photo-documentation from each photo point taken at established directions for year-to-year comparison.
- The methodologies used to gather data if different from those outlined in this plan.
- Data forms and summaries including Army Corps Routine Wetland Delineation forms and additional hydrologic, soil and vegetation data.

- A comparison of past and current conditions at each restoration site in relation to prior condition and to performance criteria.
- Identification of contingency plan options for addressing performance criteria that are not met.

Table 5 lists monitoring and reporting applicable to each site:

Table 5: ***Monitoring and Reporting for Individual Sites***[1]

Site	Detailed Monitoring	Routine Monitoring	Progress Reports	Annual Report
G-1	3 years	2 years	2004	2005-2009
G-2	NA	2 years[2]	2004	2004-2009
G-3SW	3 years	2 years	2004	2005-2009
G-3NW	3 years	2 years	2004	2005-2009
G4	NA	2 years[2]	2004	2005-2009
G5	3 years	2 years	2004	2005-2009
G6	3 years	2 years	2004	2005-2009
G7	3 years	2 years	2004	2005-2009
G8	3 years	2 years	2004	2005-2009
G9	NA	2 years[2]	2004	2004-2009
G10	3 years	2 years	2004	2005-2009
G11	3 years	2 years	2004	2005-2009
G12	3 years	2 years	2004	2005-2009
103	3 years	2 years	2004	2005-2009
103a	3 years	2 years	2004	2005-2009
111	3 years	2 years	2004	2005-2009
114	3 years	2 years	2004	2005-2009
GC-M	3 years	2 years	2004	2005-2009

[1] Monitoring and reporting as indicated or until success criteria is met

[2] Areas graded and planted in 2004 and 2005 will be monitored for 5 years from the year of planting (3 years detailed and 2 years routine)

6.0 IMPLEMENTATION SCHEDULE

Table 6 lists tasks and anticipated completion dates for the first year's effort.

Table 6: ***Proposed Implementation Schedule for 2004-2005***

Task	Anticipated Completion Date
Seed collection	Completed in July-August 2003
Monitoring well monitoring	May-October 2004
Monitoring well report	July 12, 2004
Contract plug growing	2004 - 2005
Topographic adjustments, installation of water spreaders, outlets, erosion control features	July – September 2004
Vegetation seeding of species planted as seed	As snow allows access and topographic adjustment is completed
Vegetation planting of plugs and trees	By August 15, 2004 or during Spring 2005
Reporting –progress updates on restoration/mitigation	1st and 15th of each month, July-October 2004
Reporting – special circumstances, such as performance issues	As needed
Monitoring	August 2005
Reporting – annual monitoring report	November 2005

7.0 DEADLINES FOR COMPLIANCE WITH CONSENT DECREE

The work described in this Restoration Plan is being undertaken pursuant to a Consent Decree entered into between the United States and various entities connected to the Yellowstone Mountain Club property. All disputes arising from this section may be subject to dispute resolution under the Consent Decree. Table 7 provides deadlines for complying with the consent decree.

Table 7: ***Deadlines for Consent Decree***

Section	Description of Work	Deadline	Comments
3.3.1	Meet hydrologic criteria for all wetlands restoration sites,	Report due November 1, 2005 and November 1 each year until the end of monitoring for each site	
3.3.1	Meet soil criteria for all wetlands restoration sites	Report due November 1, 2006 and November 1 each year until the end of monitoring for each site	Failure to meet soil criteria will not be considered a failure if hydrologic and vegetative criteria are being achieved
3.3.1	Meet vegetation criteria for all wetlands restoration sites	Report due November 1, 2005 and November 1 each year until the end of monitoring for each site	Will not begin until 2006 if planting is delayed until spring 2005.
3.3.1	Meet hydrologic criteria for wetland mitigation site	Report due November 1, 2006 and November 1 each year until the end of monitoring for each site	
3.3.1	Meet soil criteria for wetland mitigation site	Report due November 1, 2006 and November 1 each year until the end of monitoring for each site	Failure to meet soil criteria will not be considered a failure if hydrologic and vegetative criteria are being achieved
3.3.1	Meet vegetation criteria for wetland mitigation site	Report due November 1, 2006 and November 1 each year until the end of monitoring for each site	
3.3.1	Meet vegetation criteria for channel restoration	Report due November 1, 2005 and November 1 each year until the end of monitoring for each site	Will not begin until 2006 if planting is delayed until spring 2005.
3.3.1	Meet bank stability criteria for channel restorations	Report due November 1, 2005 and November 1 each year until the end of	

Table 7: ***Deadlines for Consent Decree***

Section	Description of Work	Deadline	Comments
		monitoring for each site	
5.1	Spring 2004 monitoring well reporting	Weekly well monitoring results will be reported electronically on a biweekly basis until June 30, 2004. A final report with recommendations for topographic adjustments will be provided to EPA by July 12, 2004	
5.2	Progress updates	Beginning on July 1, 2004 and then on the 1st and 15th of each month until construction and planting is complete. No reports will be provided during winter months with no activity.	Deadline assumes construction begins in June; if it does not begin until July, the first report will be due August 1, 2004.
5.3	Annual monitoring reports	November 1 of each year	

8.0 Ongoing Activities

Notwithstanding paragraph 23 of the Consent Decree, five years after completion of the work described in this Appendix, and only as permitted by applicable law, YMC shall not be prohibited from cutting vegetation in the restoration and mitigation areas to the minimum extent necessary to prevent unanticipated interference with playing golf on the immediately adjacent portions of the course as currently configured. YMC shall provide EPA with two working days' notice prior to undertaking cutting of vegetation pursuant to this provision. Further, it is acknowledged that turning off or reducing golf course irrigation in any location shall not be considered draining or dewatering as used in Paragraph 23. This Paragraph will survive termination of the Consent Decree.

9.0 REFERENCES

Chin, A. 1989. Step pool in stream channels. Progress in Physical Geography. V. 13, p. 391-407.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. FWS/OBS-79/31. U.S.D.I. Fish and Wildlife Services. Washington, D.C.

Denbow, J., D. Klemments, D. Rothman, E. Garbisch, C. Bartoulds, M. Kraus, D. MacLean, G. Thunhorst. 1996. Guidelines for the Development of Wetland Replacement Areas. Report 379: Transportation Research Board, National Research Council. pp. 41-78.

Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Wetlands Research Program Technical Report Y-87-1. Department of the Army. Vicksburg, MS.

Gish, Jim. 2003. Personal communication about sedge, grass and other plant materials used for wetland restoration March 14, 2003. Employee of Granite Seed.

Hitchcock, C. and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press. Seattle. 730p.

HDR Engineering Inc. 2002. Wetland Restoration Plan: Proposed Golf Course, Yellowstone Mountain Club. Prepared for: Yellowstone Mountain Club, P.O. Box 161097, Big Sky, MT 59716. Bozeman, MT.

HDR Engineering Inc. 2002. Revised Wetland Restoration Plan: Proposed Golf Course, Yellowstone Mountain Club. Prepared for: Yellowstone Mountain Club, P.O. Box 161097, Big Sky, MT 59716. Bozeman, MT.

Henry, Christophe P. and Claude Amoros. 1995. Restoration Ecology of Riverine Wetlands III. Vegetation Survey and Monitoring Optimization. October 1995. 4 pp.

Holzhauser, Russ. 2003. Personal communication about sedge, grass and other plant materials used for wetland restoration March 31, 2003. Russ is an employee of Western Native Seed.

Hook, P. 2003. Telephone conversation concerning the 2001 research paper with J. Klausmann and the use of seeding as a wetland restoration technique for sedges, grasses and forbs. February 20, 2003.

Klausmann, J. and P. Hook. 2001. Comparison of Seven Methods for Revegetating Sedge-Dominated Rocky Mountain Wetland. Teton County, WY and USEPA. 48p.

Klausmann, J. 2003. Telephone conversation concerning the 2001 research paper with P. Hook and the use of seeding as a wetland restoration technique for sedges, grasses and forbs. March 21, 2003.

Kolka R. K., E. A. Nelson, C. C. Trettin. 2000. Conceptual Assessment Framework for Forested Wetland Restoration: The Pen Branch Experience. Ecological Engineering 15. pp. S17-S21.

Milner, G. 2003. Wetland Mitigation Strategies for Success. Land and Water, January/February 2003. pp. 56-63.

Mitsch William J., Renee F. Wilson. 1996. Improving the Success of Wetland Creation and Restoration with Know-How, Time, and Self-Design. Ecological Applications. Vol. 6, No. 1. pp. 77-83.

Mitsch, William J., Xinyuan Wu, Robert W. Nairn. 1998. Creating and Restoring Wetlands. BioScience Vol. 48 No. 12. December 1998. pp. 1019-1030

Mitsch, J. William, James G. Gosselink. 2000. Wetlands Third Edition: Chapter19, Wetland Creation and Restoration. June 2000. pp. 653-686

Montgomery D.R. and Buffington. J.M. 1997. Channel-reach morphology in mountain drainage basins. Geol. Soc. Ameri. Bulletin, v. 109, no. 5, p. 596-611.

Natural Resources Conservation Service. 2002. Hydric soils of the United States – introduction. Downloaded from internet 6/26/2002. http://www.statlab.iastate.edu/soils/hydric/intro.html.

Nesser, J.A., Ford, G.L., Maynard, C.L., and D.S. Page-Dumroese. 1997. Ecological units of the Northern Region: subsections. General Technical Report INT-GTR-369. U.S.D.A. Forest Service. Ogden, UT. 88 pp.

Ossinger, M. 1999. Success Standards for Wetland Mitigation Projects - a Guideline. Washington State Dept. of Transportation. 31 pp.

Payne, G.F. 1973. Vegetative rangeland types in Montana. Montana Agricultural Experiment Station, Montana State University. Bozeman, MT.

Pierce, Gary J. 1996. Wetland Mitigation, Wetland Training Institute (presented by Wetland Training Institute, Red Lodge, MT) June 17-21, 1996. 19 pp.

Reed, P.B. 1988. National list of plant species that occur in wetlands: North West (Region 9). Biological Report 88(26.9). May 1988. U.S. Fish and Wildlife Service. Washington, D.C.

Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs. CO

Smith, R.D., A. Ammann, C. Bartoldus, and M.M. Brinson. 1995. An approach for assessing wetland functions using hydrogeomorphic classification, reference wetlands, and functional indices. Wetland Research Program Technical Report WRP-DE-9. U.S. Army Corps of Engineers Waterways Experiment Station. Vicksburg, MS.

Society of Wetland Scientists. 2000a. Position Paper on Performance Standards for Wetland Restoration and Creation. 4 pp.

Society of Wetland Scientists. 2000b. Position Paper on the Definition of Wetland Restoration. 8/6/2000. 3 pp.

Soil Conservation Service. 1989. Soil survey of Madison County Area, MT. Bozeman, MT.

Steinle, A. 2002. Email to Jeff Berglund, Land & Water Consulting, Inc. regarding applicable wetland plant lists in Montana. May 10, 2002. U.S. Army Corps of Engineers, Helena, MT.

Streever, B., J. Zedler. 2000. To Plant or Not to Plant. March 2000. BioScience. Vol. 50:3, pp. 188-190.

Thomas, D.B., S.R. Abt, R.A. Mussetter, and M.D. Harvey. 2000. A design procedure for sizing step-pool structures. Joint Conference on Water Resources Engineering and Water Resources Planning & Management. Am. Soc. of Civil Engineers. Minneapolis, MN.

U.S. Army Corps of Engineers. 1991a. Hydraulic design of flood control channels. EM1110-2-1601.

U.S. Army Corps of Engineers. 1991b. Questions & answers on 1987 Corps of Engineers manual. October 7, 1991

U.S. Army Corps of Engineers. 1991c. Habitat Mitigation and Monitoring Proposal Guidelines. San Francisco District. November 1991. 11p.

U.S. Army Corps of Engineers. 1992. CECW-OR – March 6, 1992 memorandum: clarification and interpretation of the 1987 manual.

U.S. Army Corps of Engineers. 2001a. Omaha Regulatory Definitions. Terminology and Definitions, Goldsberry, May 2001. Downloaded from http://www.nwo.usace.army.mil/html/od-tl/textsearch/GUIDANCE/Definitions%20Omaha%20Regulatory%20May01.html 2/20/2003. 31 pp.

U.S. Army Corps of Engineers. 2001b. Jurisdictional determinations case specific questions and answers (SWANCC case studies, questions and answers, Goldsberry, (Q&A) May-2001). Omaha, NE. Downloaded from http://www.nwo.usace.army.mil/html/od-tl/textsearch/SWANCC/SWANCC%20Omaha%20JD%20Case%20Studies%20May01.html on February 19, 2003. 8 pp.

U.S. Army Corps of Engineers. 2002a. National Wetlands Mitigation Action Plan. December 24, 2002. 5 pp & 7 pp.

U.S. Army Corps of Engineers. 2002b. Regulatory Guidance Letter: Guidance on Compensatory Mitigation Projects for Aquatic Resource Impacts Under the Corps Regulatory Program Pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. December 4, 2002. No. 02-2 16 pp.

U.S. Army Corps of Engineers: Sacramento District Regulatory Program. 1996. Habitat Mitigation and Monitoring Proposal Guidelines. Downloaded from http://www.spk.usace.army.mil/cespk-co/regulatory/habmitmon.html 2/11/2003. 30 pp.

U.S. Army Corps of Engineers: Wetlands Research Program (WRP). 1992a. Design and Construction Requirements for Establishing Herbaceous Wetland Vegetation. May 1993. WRP Technical Note VN-EM-3.1. 4 pp.

U.S. Army Corps of Engineers: Wetlands Research Program (WRP). 1992b. Wetlands Engineering: Design Sequence for Wetlands Restoration and Establishment. May 1992. WRP Technical Note WG-RS-3.1. 4 pp.

U.S. Army Corps of Engineers: Wetlands Research Program (WRP). 1993a. Wetlands Mitigation Evaluation: A Bibliography. Jan. 1993. WRP Technical Note WG-EV-6.1. 3 pp.

U.S. Army Corps of Engineers: Wetlands Research Program (WRP). 1993b. Baseline Site Assessments for Wetland Vegetation Establishment. August 1993. WRP Technical Note VN-EV-2.1. 6 pp.

U.S. Army Corps of Engineers: Wetlands Research Program (WRP). 1993c. Basic Considerations for Vegetative Design of Wetlands. August 1993. WRP Technical Note VN-EM-3.2. 5 pp.

U.S. Army Corps of Engineers: Wetlands Research Program (WRP). 1999. Examples of Performance Standards for Wetland Creation and Restoration in Section 404 Permits and an Approach to Developing Performance Standards. January 1999. WRP Technical Note WG-RS-3.3 14 pp. 5 pp.

U.S. Environmental Protection Agency. 1993. Restoring and Creating Wetlands: A Handbook for the Rocky Mountain West. EPA908-B-95-900. January 1993. 42 pp.

Wetlands West. 2000. Wetland delineation for the proposed Yellowstone Mountain Club, Golf Course. April 2001. Prepared for: Yellowstone Mountain Club, P.O. Box 161097, Big Sky, MT 59716. Bozeman, MT.

Western Regional Climate Center. 2003. Length of "freeze free" season probabilities for Big Sky 3S, Montana (240775). Downloaded from internet 1/23/2003. http://www.wrcc.dri.edu/cgi-bin/cliTFrezD.pl?mtbig3.

Zedler, J. B. 2000. Progress in Wetland Restoration Ecology. Tree Vol.15, no. 10. October 2000. pp. 402-407.

FIGURES

LAND & WATER

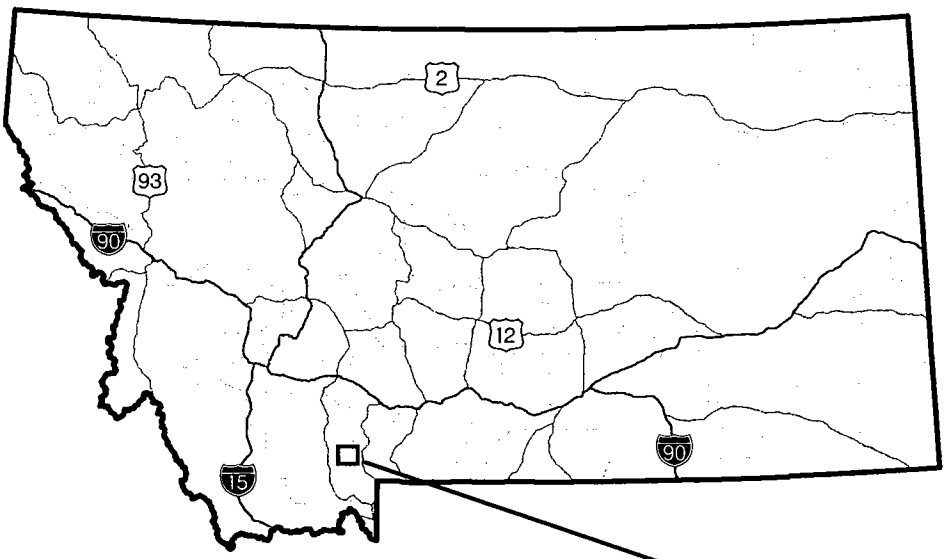
FIGURES

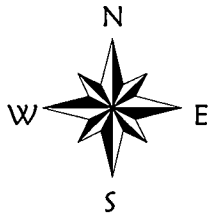
Yellowstone Mountain Club Golf Course
Wetland Restoration Project

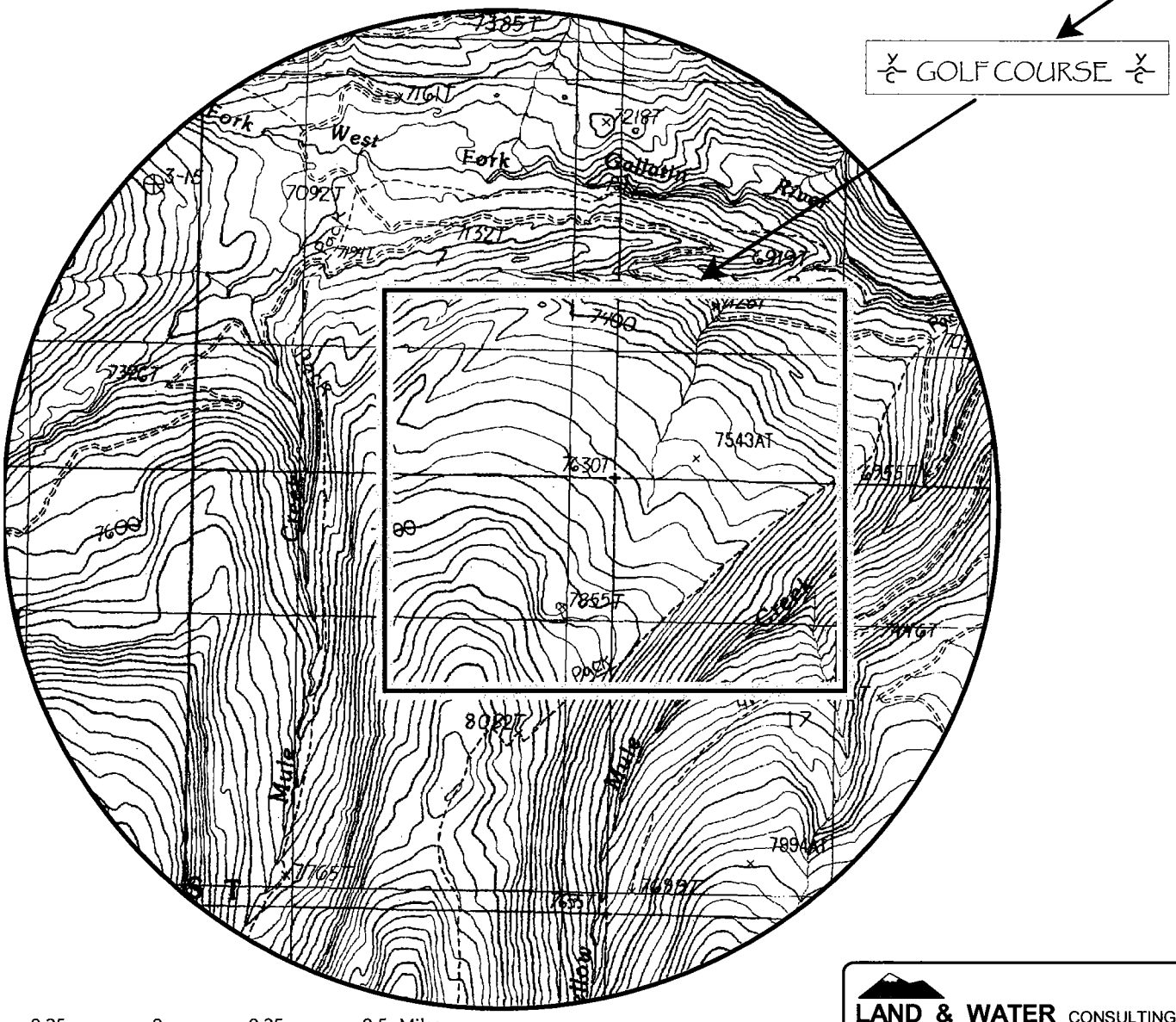
LAND & WATER

Figure 1. Project Location

Yellowstone Mountain Club Golf Course







0.25 0 0.25 0.5 Miles

250 0 250 500 750 Meters

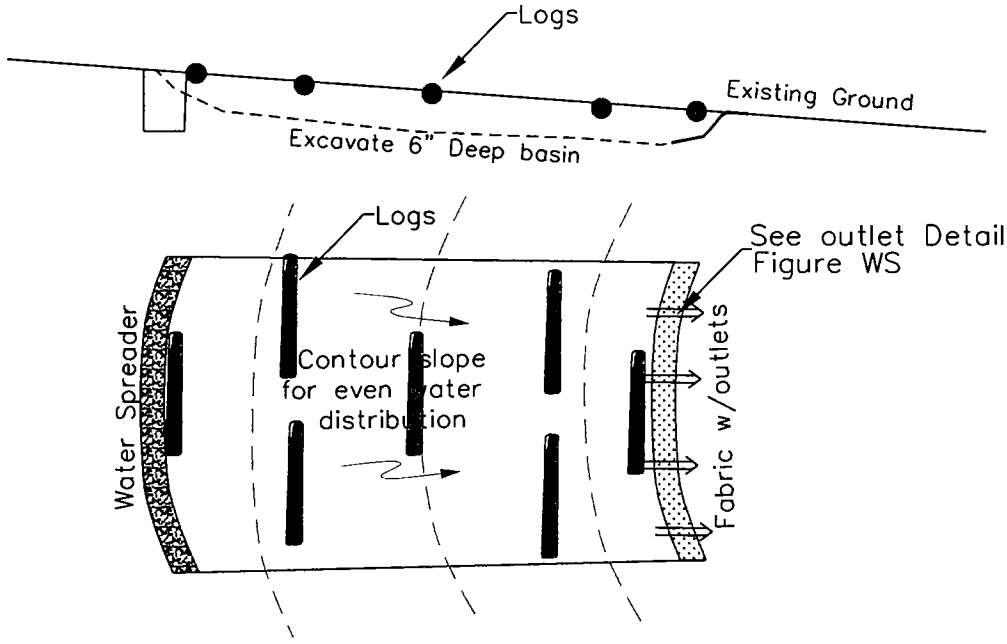
LAND & WATER CONSULTING, INC.

1120 Cedar Street PO Box 8254 Missoula, MT 59807

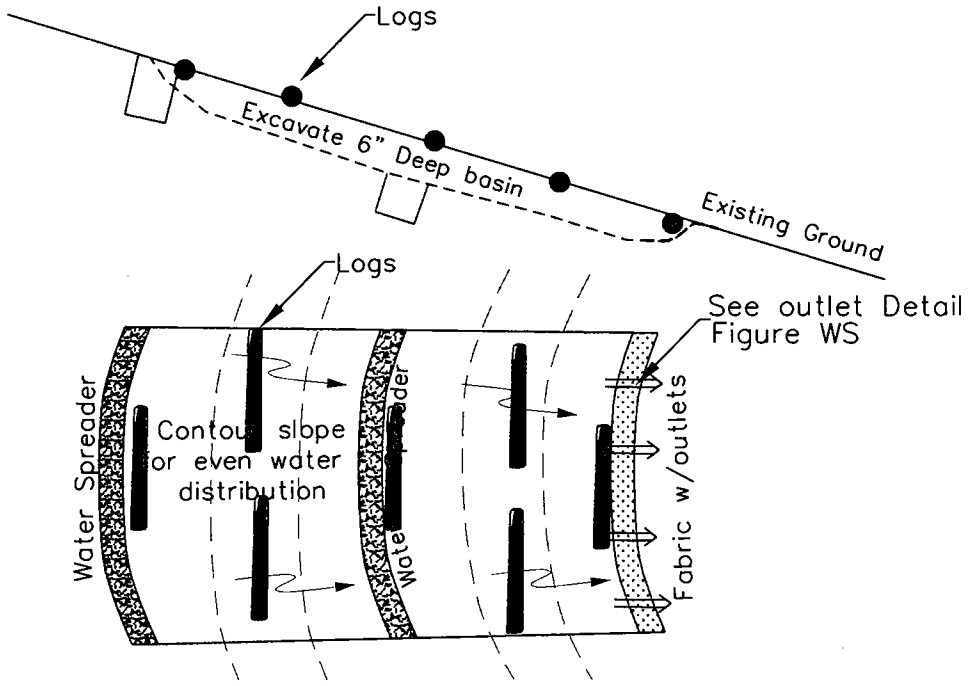
Figure -2a
Water Spreader - General Wetland Design

YELLOWSTONE MOUNTAIN CLUB
WETLAND RESTORATION

Nearly Level Sites



Steeper Sites



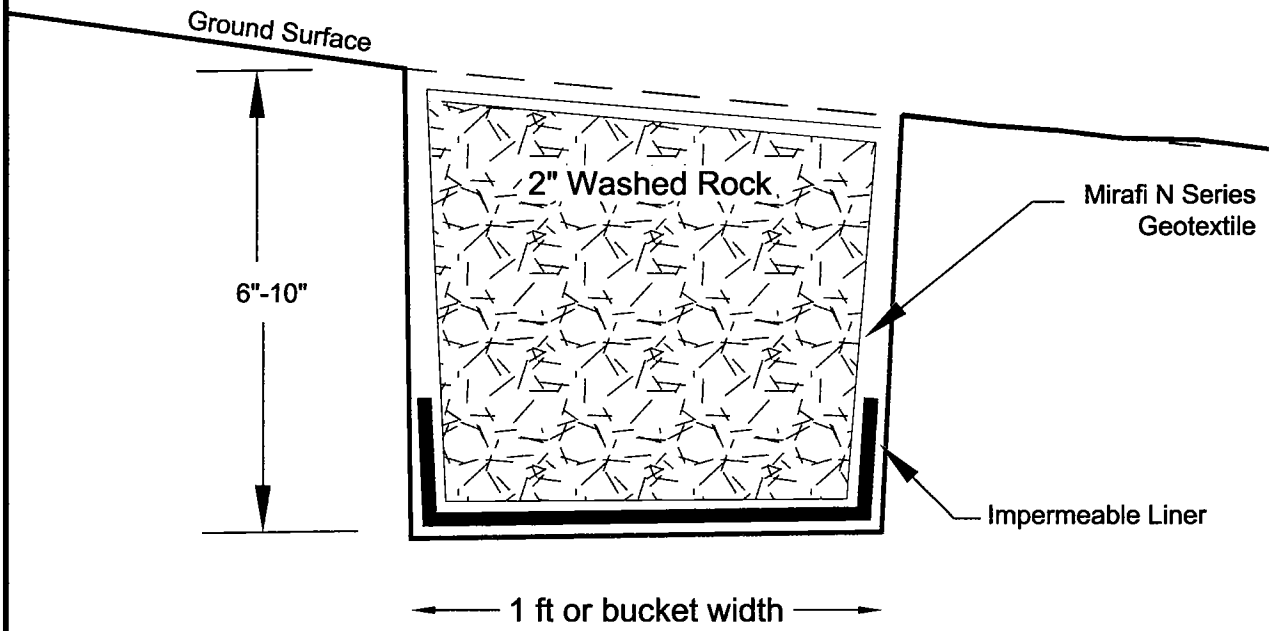
LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

PLOTTED DATE: Jun/08/2004 - 04:42:51 pm
DRAWING NAME:
L:\140347 Golf Course\dwg\Final\wetland-design1.dwg
SHEET 1 OF 2

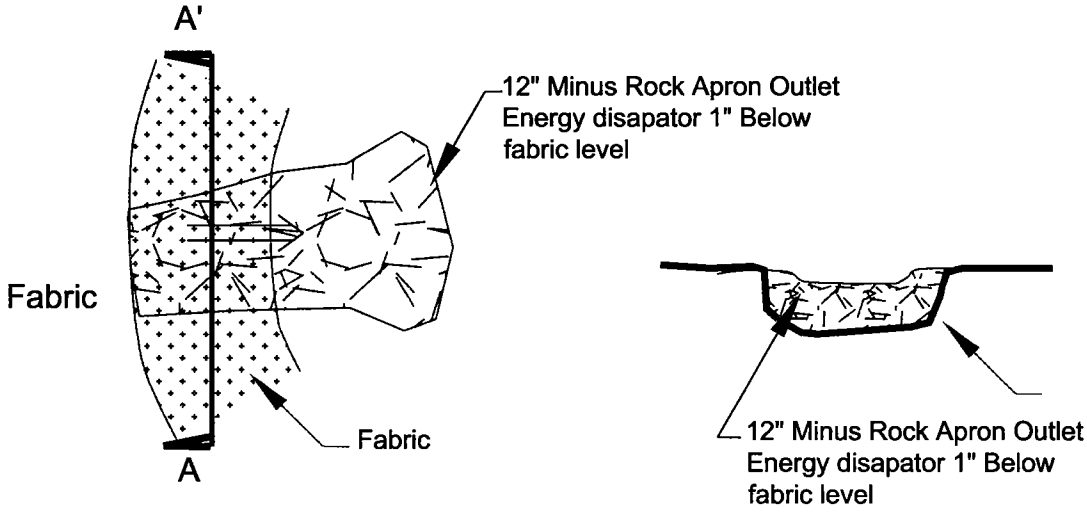
Figure -2b
Water Spreader & Outlet Detail

YELLOWSTONE MOUNTAIN CLUB
WETLAND RESTORATION

Trench Detail



Wetland Outlet Detail

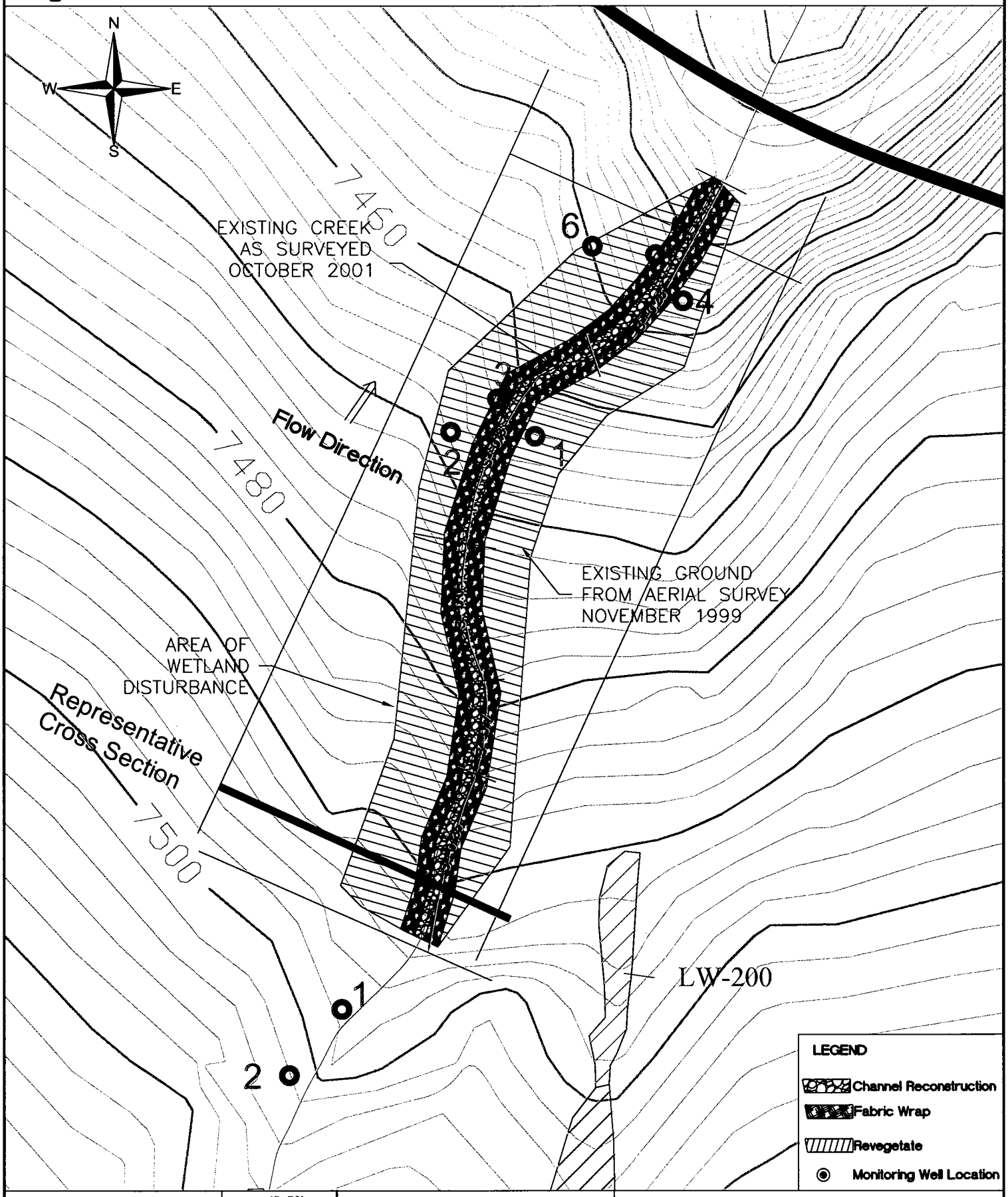


Section 'A-A'

LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

PLOTTED DATE: Jun/08/2004 - 04:43:18 pm
DRAWING NAME:
L:\140347 Golf Course\dwg\Final\wetland-design1.dwg
SHEET 2 OF 2

Fig. 3A-G1: Restoration Site

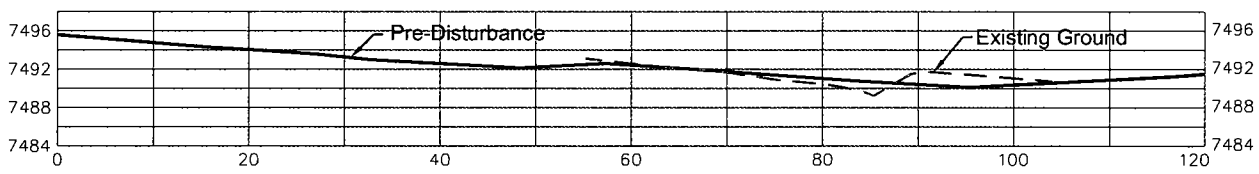


LAND & WATER CONSULTING, INC.	SCALE: 1"=50'
P.O. BOX 8254 Missoula, MT 59807	LOCATION: Big Sky, MT
Base map data supplied by Morrison Maierle, Inc.	PROJ NO: 140347
PLOTTED DATE: Jun/10/2004	DRAWN: MW/RA
L:\140347 Golf Course\dwg\Final\Figure 3's\G1-fig3.dwg	DATE: 04/09/03

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

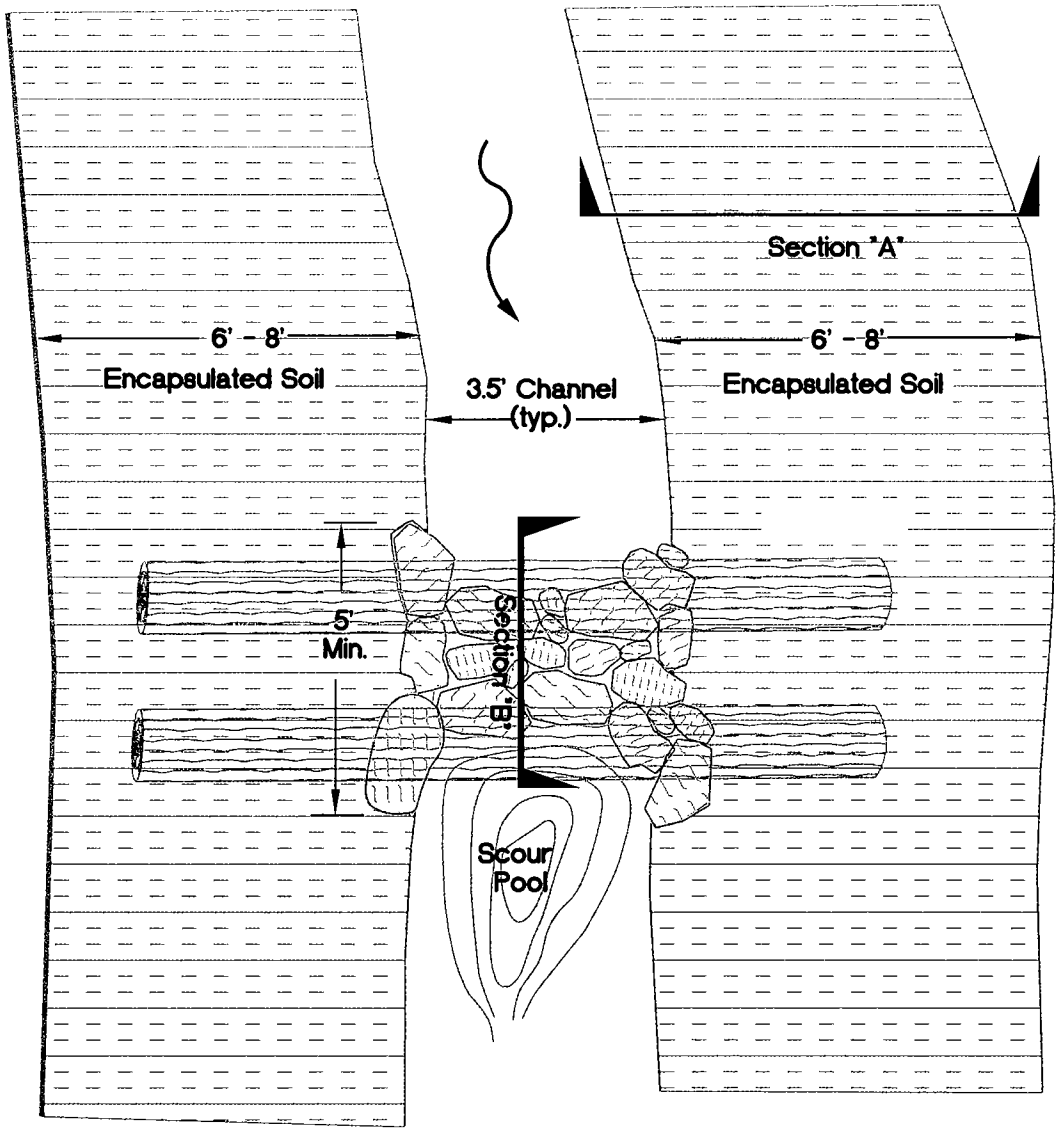
Fig. 3A-G1: Restoration Site
Sheet 1 of 4

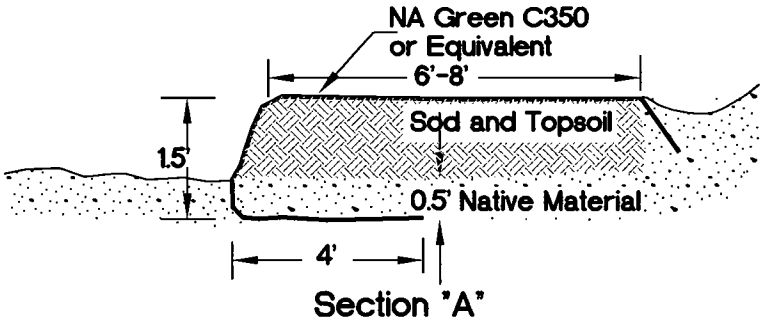
Fig. 3B-G1: Representative Grading Cross Section



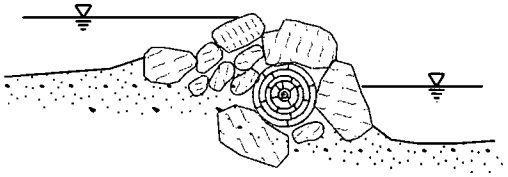
LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maielre, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G1-fig3.dwg	SCALE: 1"=20' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3B-G1: Representative Grading Cross Section Sheet 2 of 4

Fig. 3C-G1: Step-Pool Typical Plan





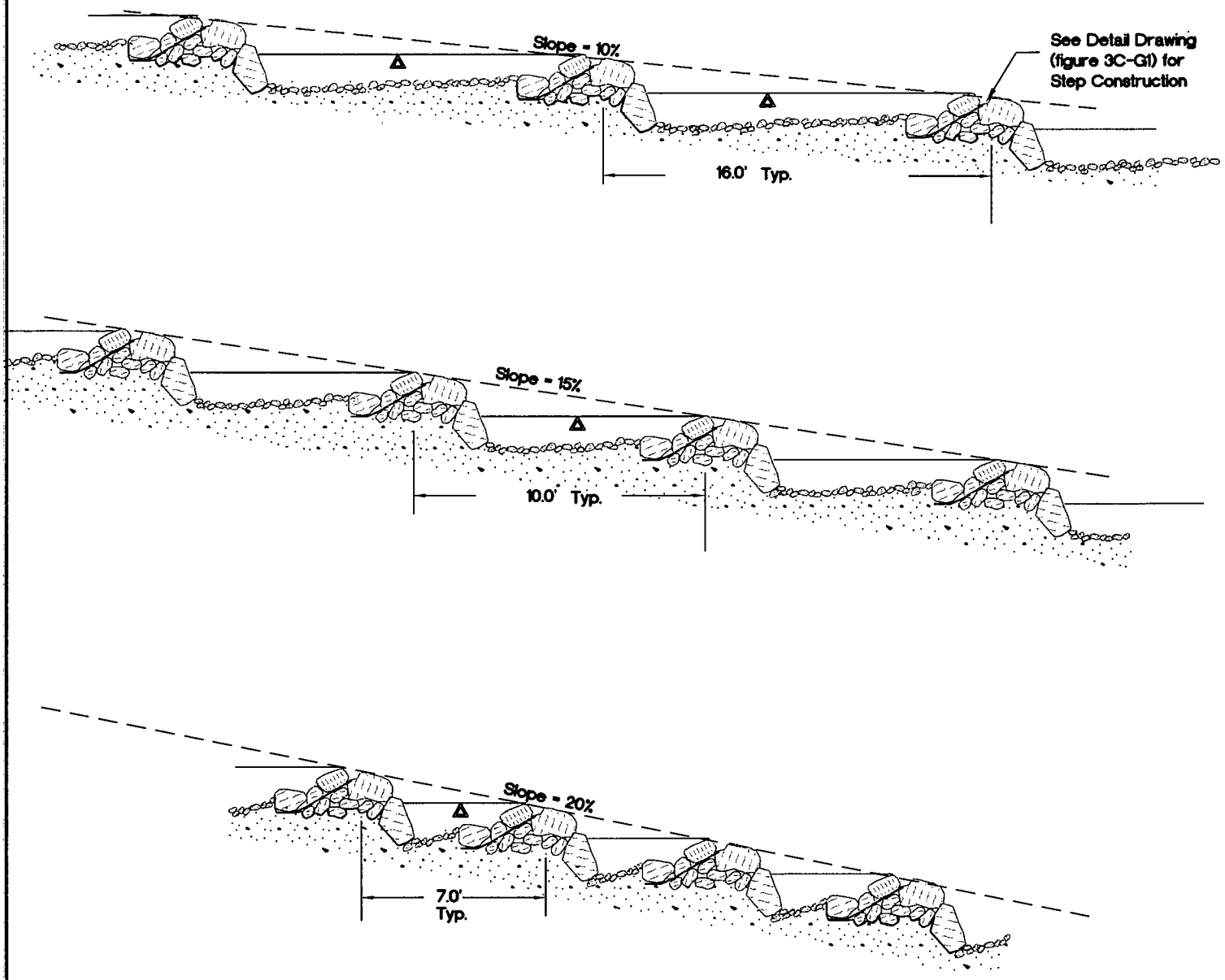
Section "A"



Section "B"

LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maielre, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G1-fig3.dwg	SCALE: Not to Scale LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3C-G1: Step-Pool Typical Plan Sheet 3 of 4

Fig. 3D-G1: Step-Pool Spacing for different channel gradients

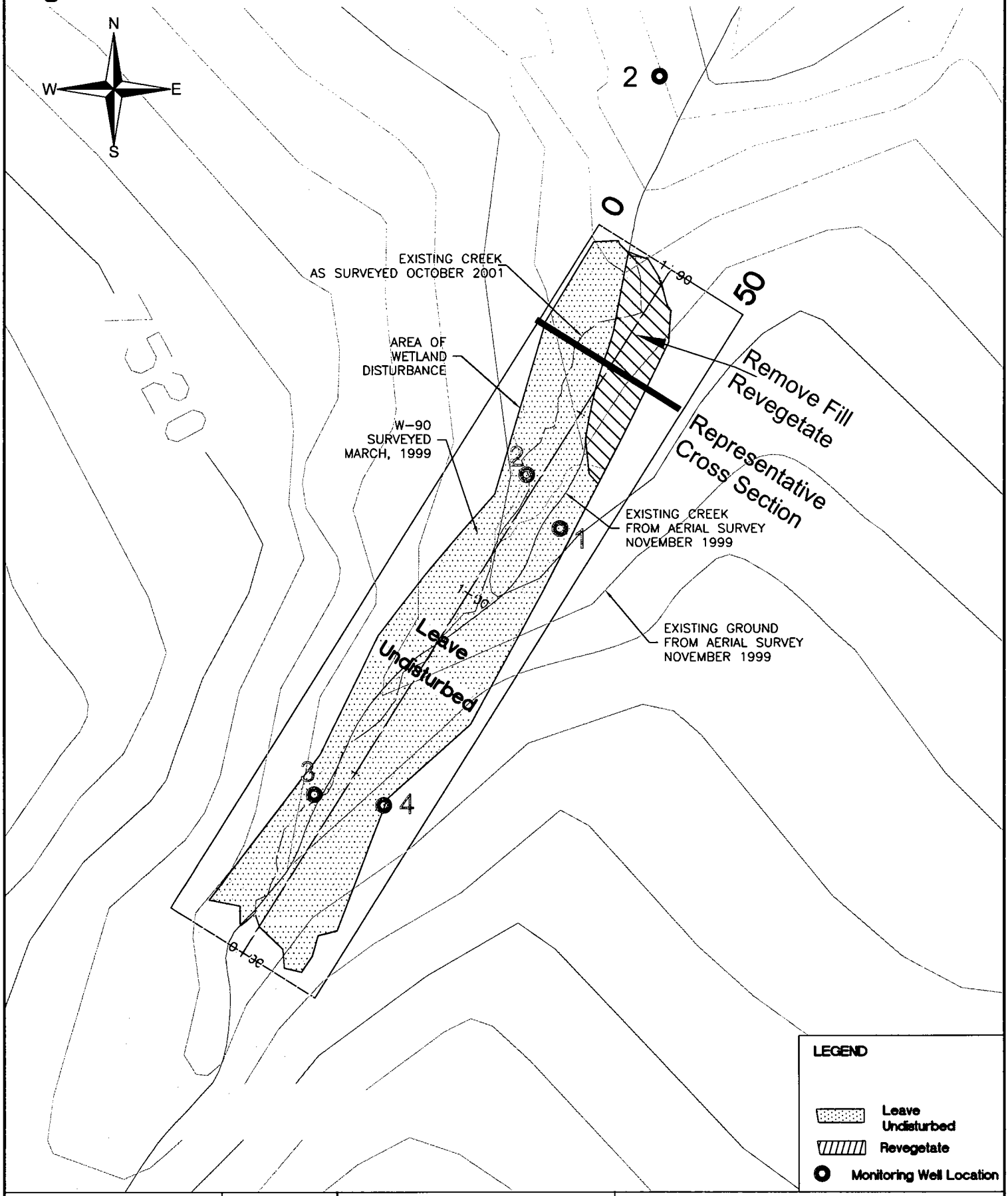


NOTES:

1. Install fabric so that no voids exist between fabric and soil.
2. Install fabric staples as per manufacturers specifications.
3. Install wood pieces averaging 8 inches diameter and 4 feet in length in the stream bank and extending into the stream channel prior to installation of fabric.
4. Configuration of channel form, wood, step spacing and other aspects of this design may be modified during construction by oversight hydrologist to optimize habitat values and channel stability.

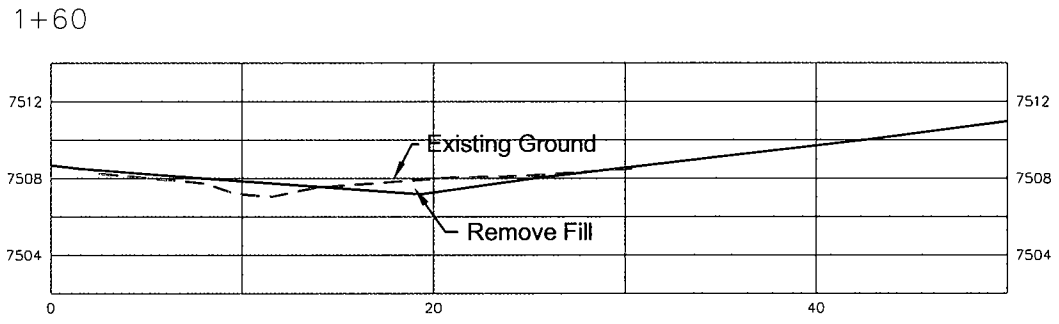
LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maierle, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G1-fig3.dwg	SCALE: Not to Scale LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3D-G1: Step-Pool Spacing Sheet 4 of 4

Fig. 3A-G2: Restoration Site



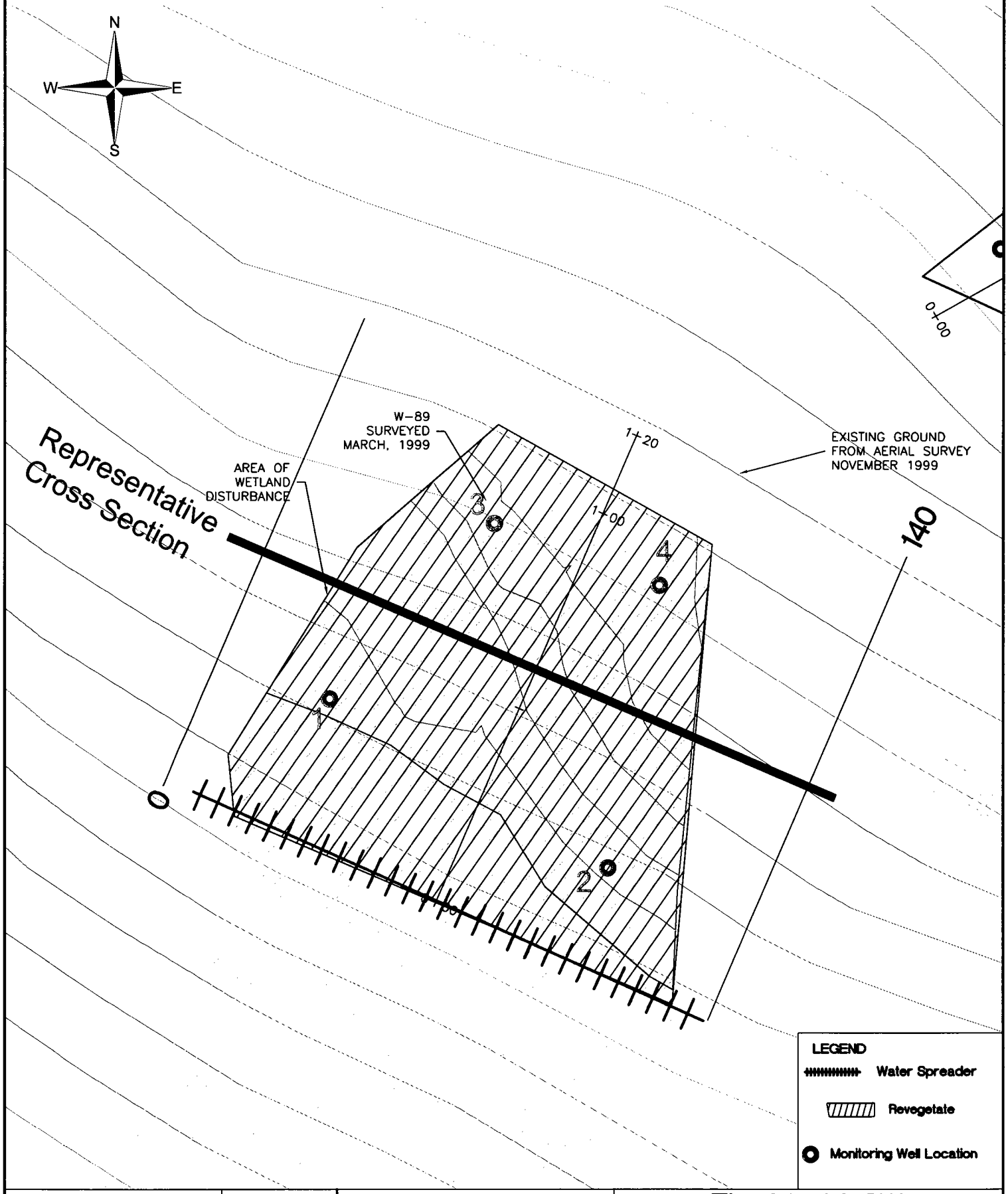
LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maierle, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G2-fig3.dwg	SCALE: 1"=30' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/11/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3A-G2: Restoration Site Sheet 1 of 2

Fig. 3B-G2: Representative Grading Cross Section



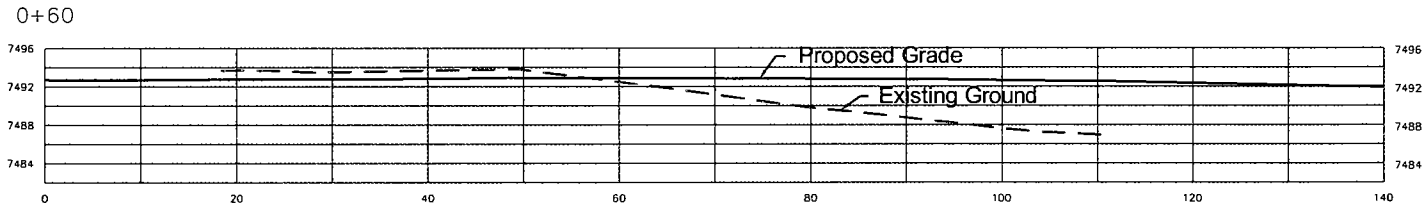
LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maierle, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G2-fig3.dwg	SCALE: 1"=10' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/11/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3B-G2: Representative Grading Cross Section Sheet 2 of 2

Fig. 3A-G3 SW: Restoration Site



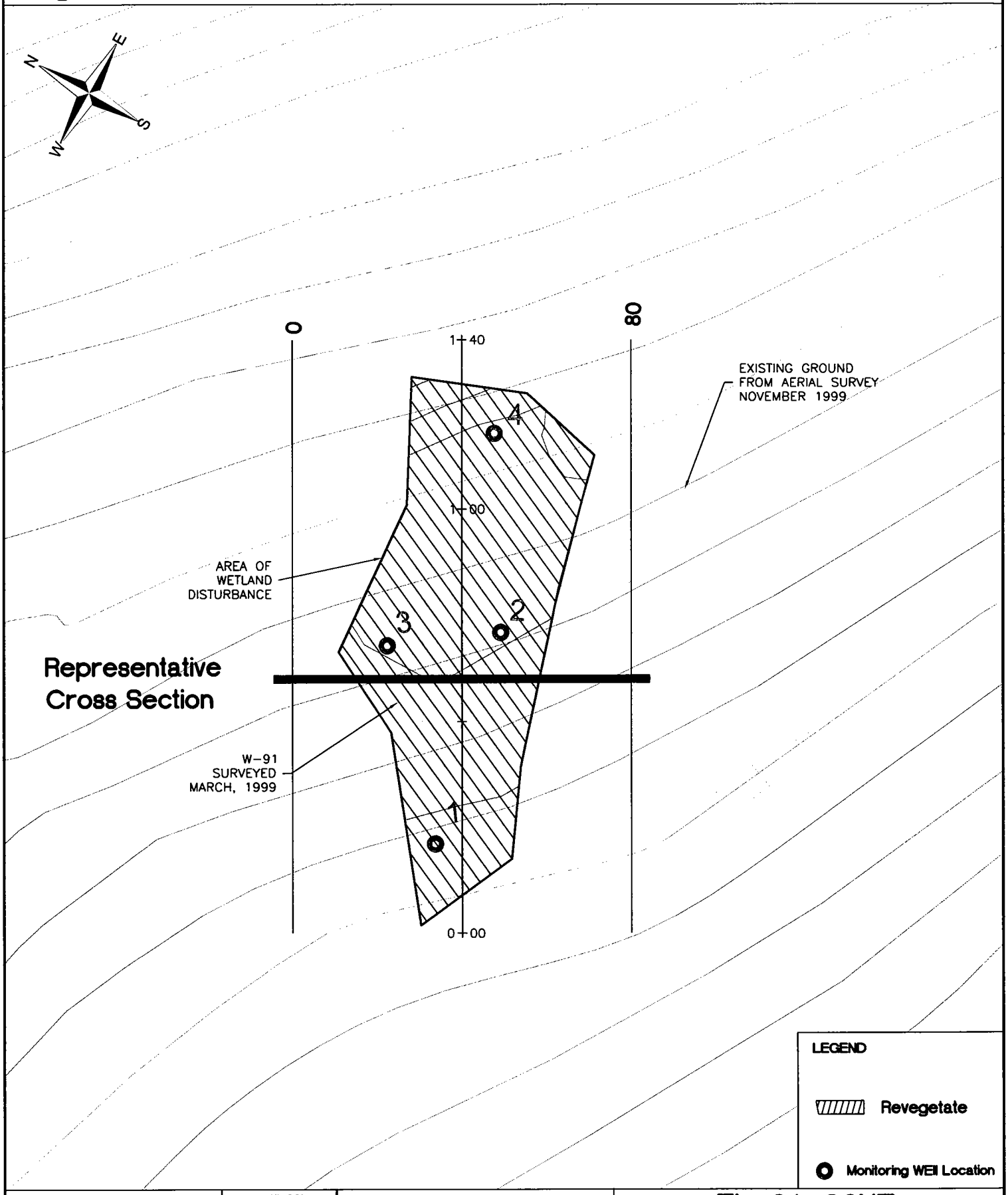
LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maieire, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G3-fig3.dwg	SCALE: 1"=30' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3A-G3 SW: Restoration Site Sheet 1 of 2

Fig. 3B-G3SW: Representative Grading Cross Section



LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maierle, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G3-fig3.dwg	SCALE: 1"=20' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3B-G3SW: Representative Grading Cross Section Sheet 2 of 2

Fig. 3A-G3NE:Restoration Site



LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

Base map data supplied by Morrison Maielre, Inc.

PLOTTED DATE: Jun/10/2004

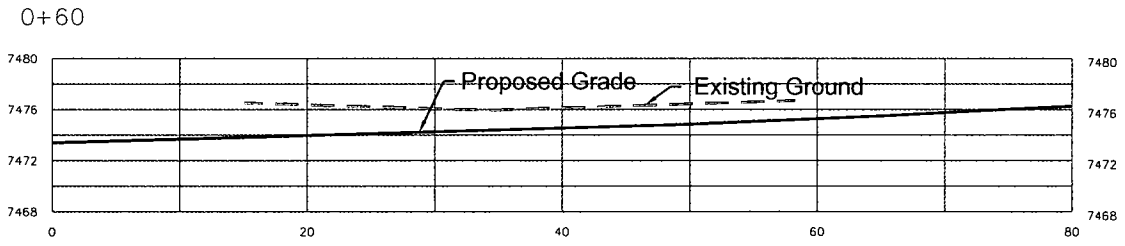
L:\140347 Golf Course\dwg\Final\Figure 3's\G3-fig3.dwg

SCALE:	1"=30'
LOCATION:	Big Sky, MT
PROJ NO:	140347
DRAWN:	MW/RA
DATE:	04/09/03

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

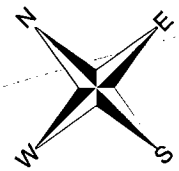
Fig. 3A-G3NE:
Restoration Site
Sheet 1 of 2

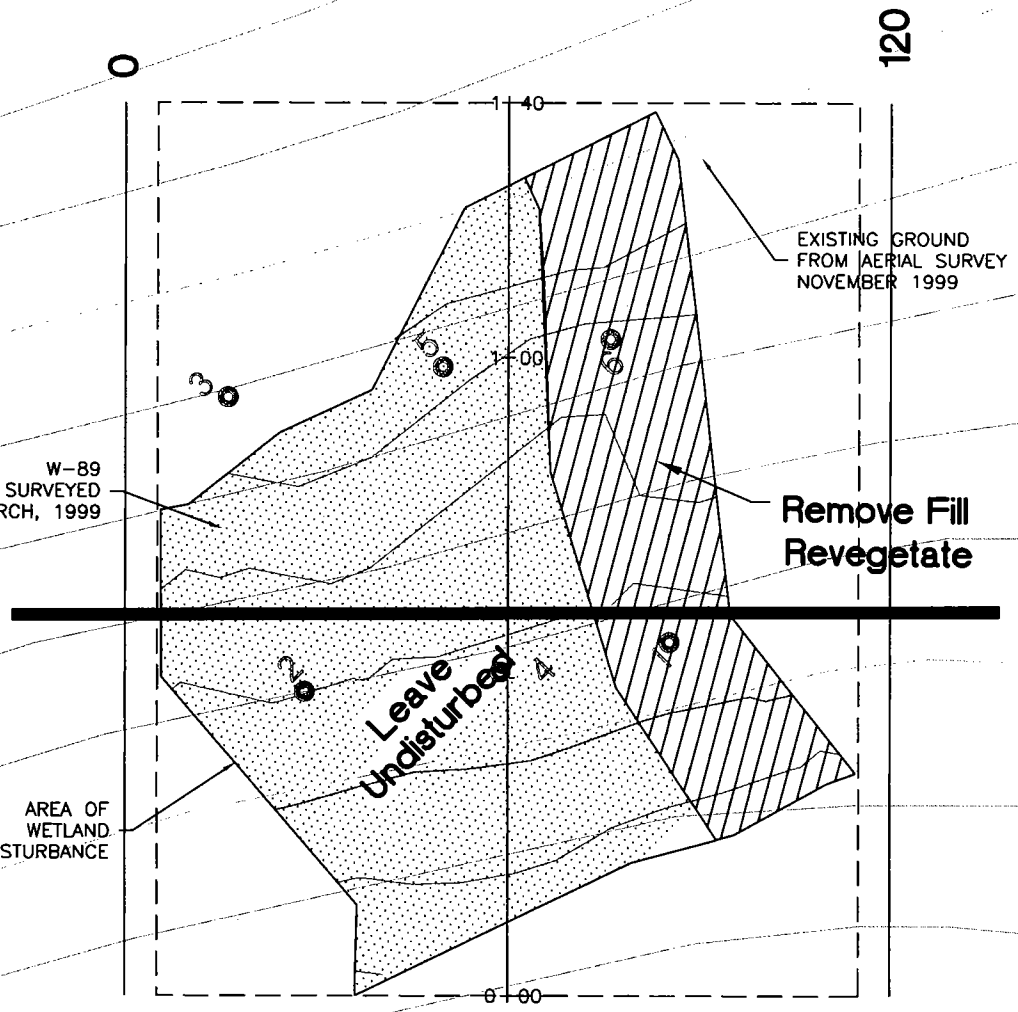
Fig. 3B-G3NE: Representative Grading Cross Section



LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maielre, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G3-fig3.dwg	SCALE: 1"=15' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3B-G3 NE: Representative Grading Cross Section Sheet 2 of 2

Fig. 3A-G4: Restoration Site



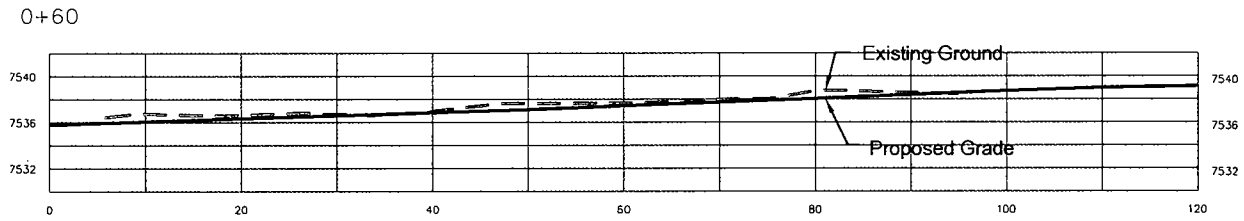


LEGEND

- Leave Undisturbed
- Revegetate
- Monitoring Well Location

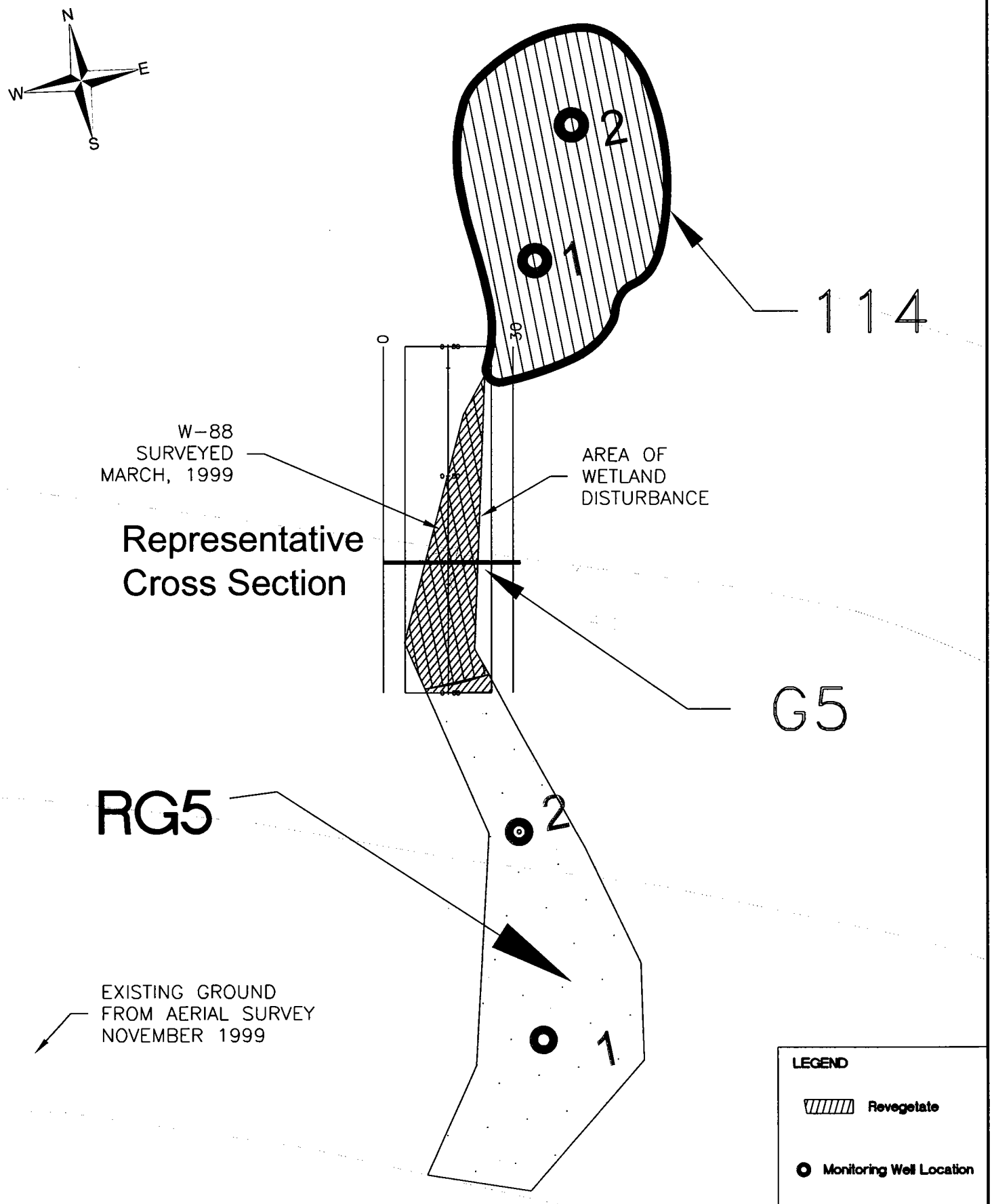
LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maielre, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G4-fig3.dwg	SCALE: 1"=30' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3A-G4: Restoration Site Sheet 1 of 2

Fig. 3B-G4: Representative Grading Cross Section



LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maierle, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G4-fig3.dwg	SCALE: 1"=20' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3B-G4: Representative Grading Cross Section Sheet 2 of 2

Fig. 3A-G5: Restoration Site



LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

Base map data supplied by Morrison Maierle, Inc.

PLOTTED DATE: Jun/10/2004

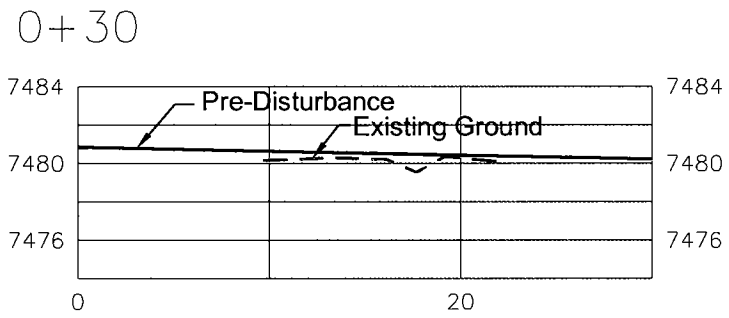
L:\140347 Golf Course\dwg\Final\Figure 3's\G5-G6-114.dwg

SCALE:	1"=30'
LOCATION:	Big Sky, MT
PROJ NO:	140347
DRAWN:	MW/RA
DATE:	04/09/03

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

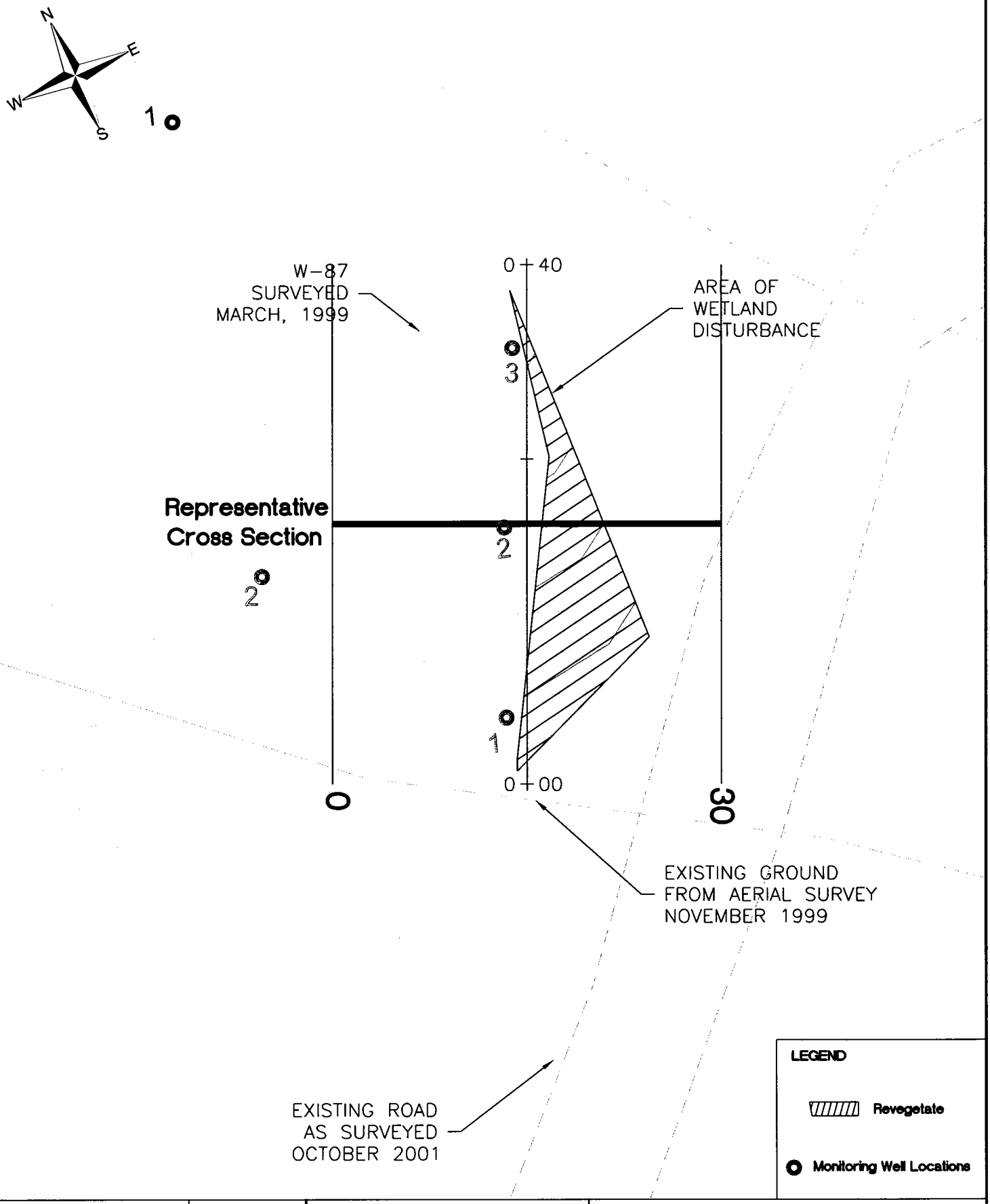
Fig. 3A-G5: Restoration Site
Sheet 1 of 2

Fig. 3B-G5: Representative Grading Cross Section



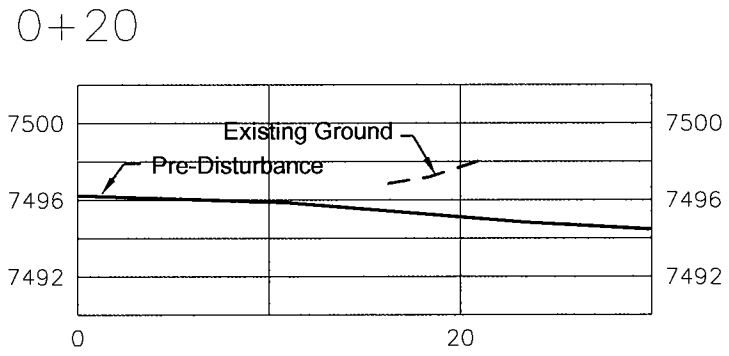
LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maielre, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G5-G6-114.dwg	SCALE: 1"=10' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3B-G5: Representative Grading Cross Section Sheet 2 of 2

Fig. 3A-G6: Restoration Site



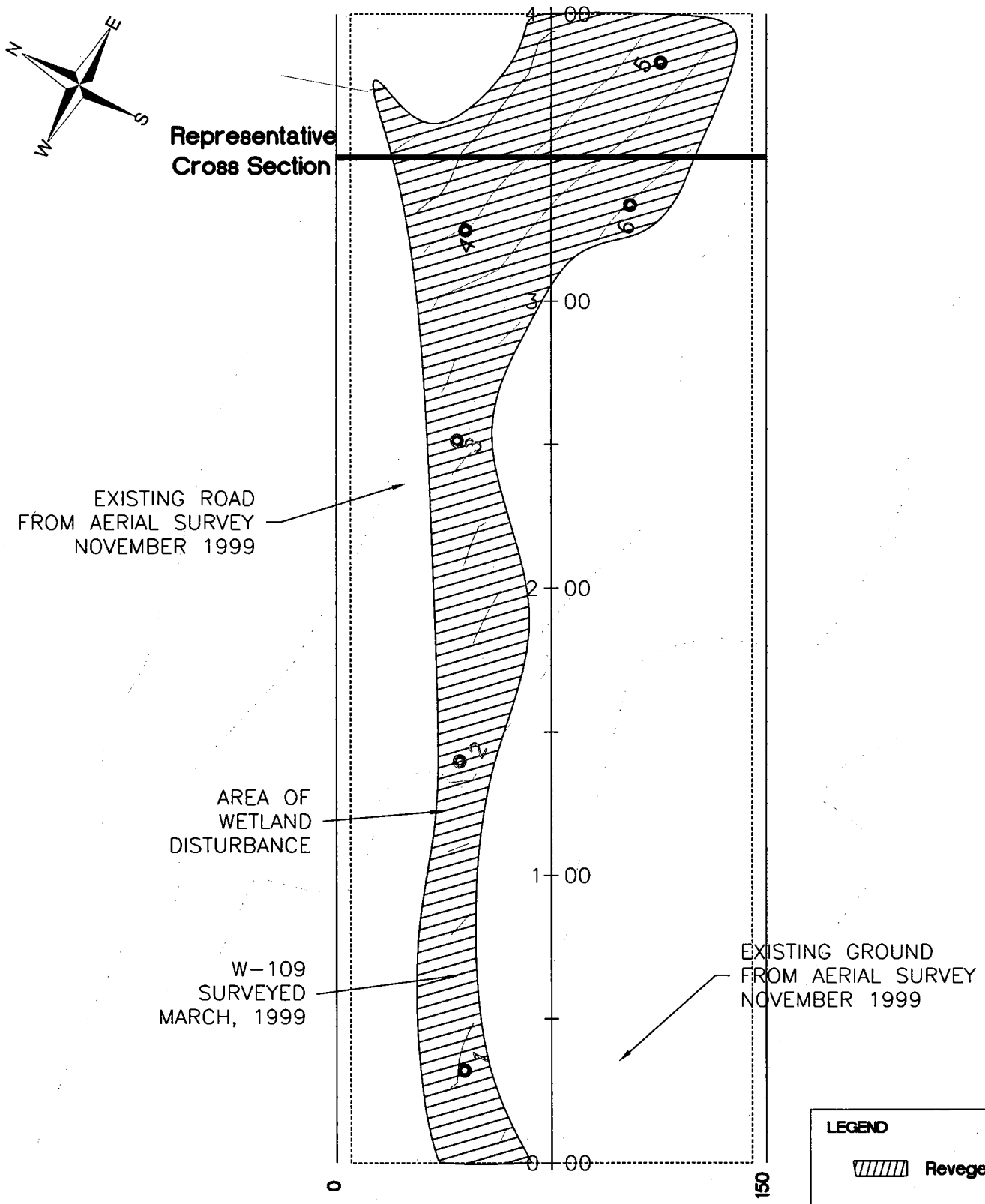
LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maierle, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G5-G6-114.dwg	SCALE: 1"=10' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3A-G6: Restoration Site Sheet 1 of 2

Fig. 3B-G6: Representative Grading Cros



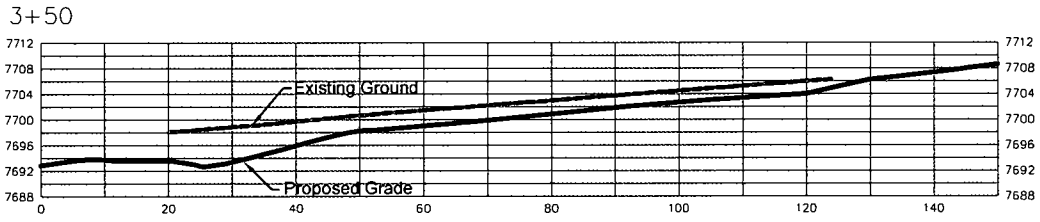
LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maierle, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G5-G6-114.dwg	SCALE: 1"=10' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3B-G6: Representative Grading Cross Section Sheet 2 of 2

Fig. 3A-G7: Restoration Site



LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maierle, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G7-fig3.dwg	SCALE: 1"=50' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3A-G7: Restoration Site Sheet 1 of 2

Fig. 3B-G7: Representative Grading Cross Section



LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

Base map data supplied by Morrison Maielre, Inc.

PLOTTED DATE: Jun/10/2004

L:\140347 Golf Course\dwg\Final\Figure 3's\G7-fig3.dwg

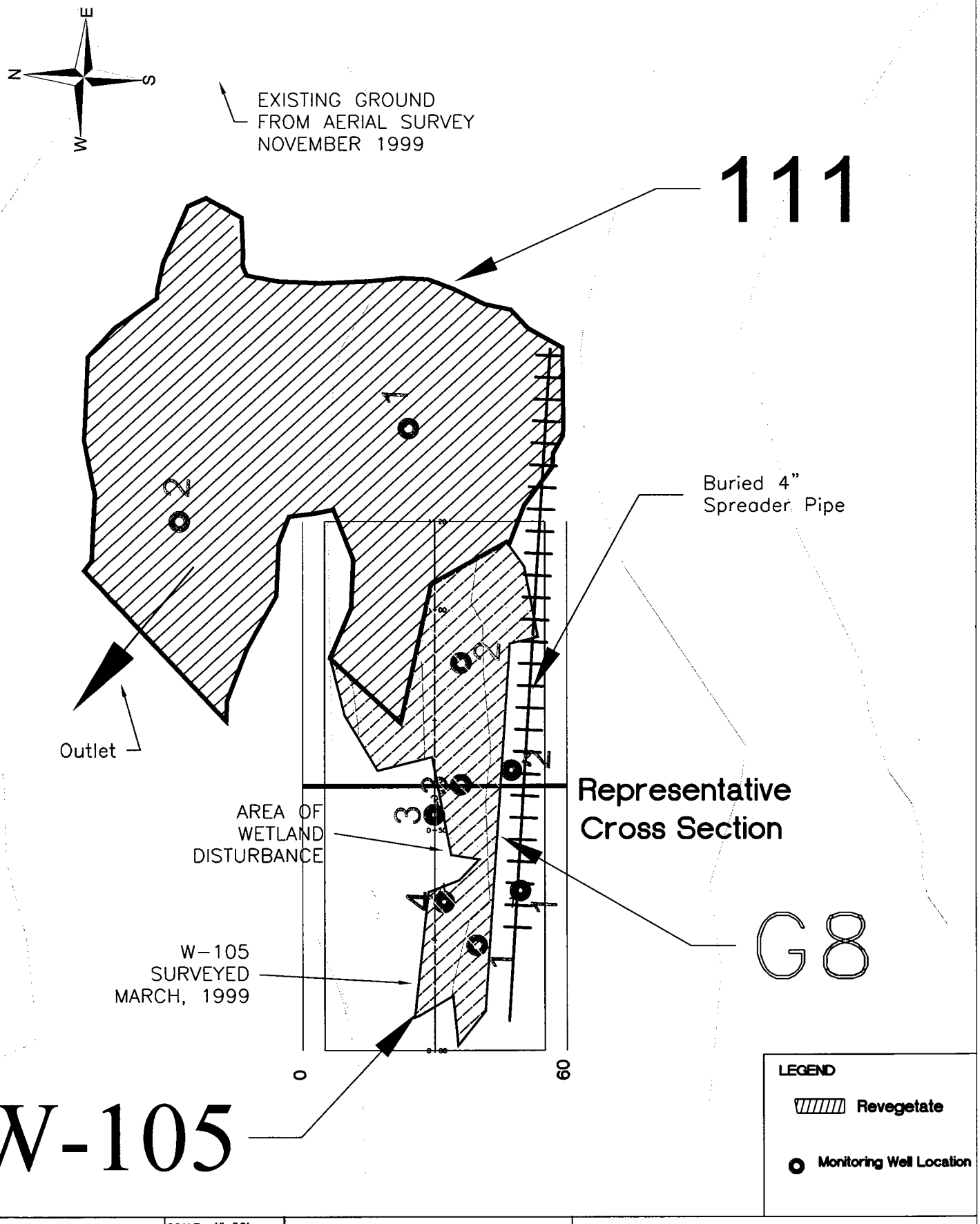
SCALE:	1"=30'
LOCATION:	Big Sky, MT
PROJ NO:	140347
DRAWN:	MW/RA
DATE:	04/09/03

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

Fig. 3B-G7: Representative Grading Cross Section

Sheet 2 of 2

Fig. 3A-G8: Restoration Site



LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

Base map data supplied by Morrison Maierle, Inc.

PLOTTED DATE: Jun/10/2004

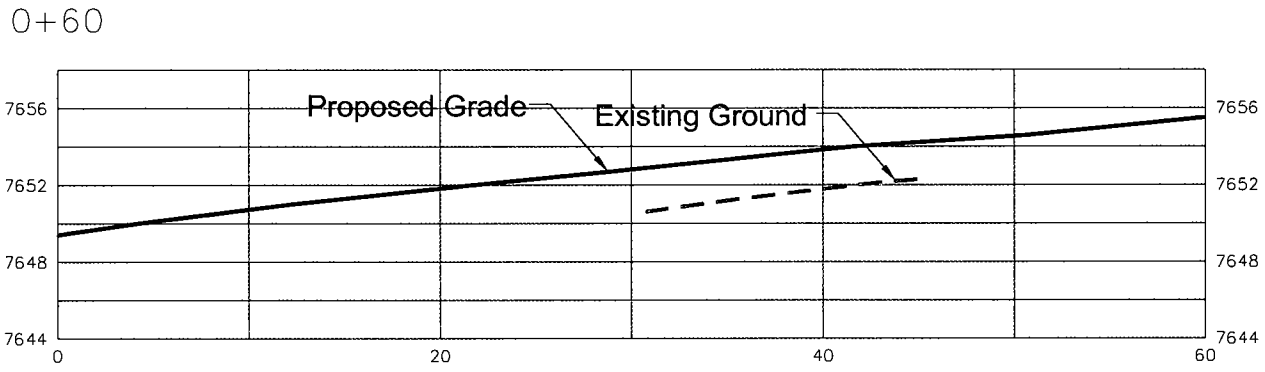
L:\140347 Golf Course\dwg\Final\Figure 3's\G8-9-111.dwg

SCALE:	1"=30'
LOCATION:	Big Sky, MT
PROJ NO:	140347
DRAWN:	MW/RA
DATE:	04/09/03

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

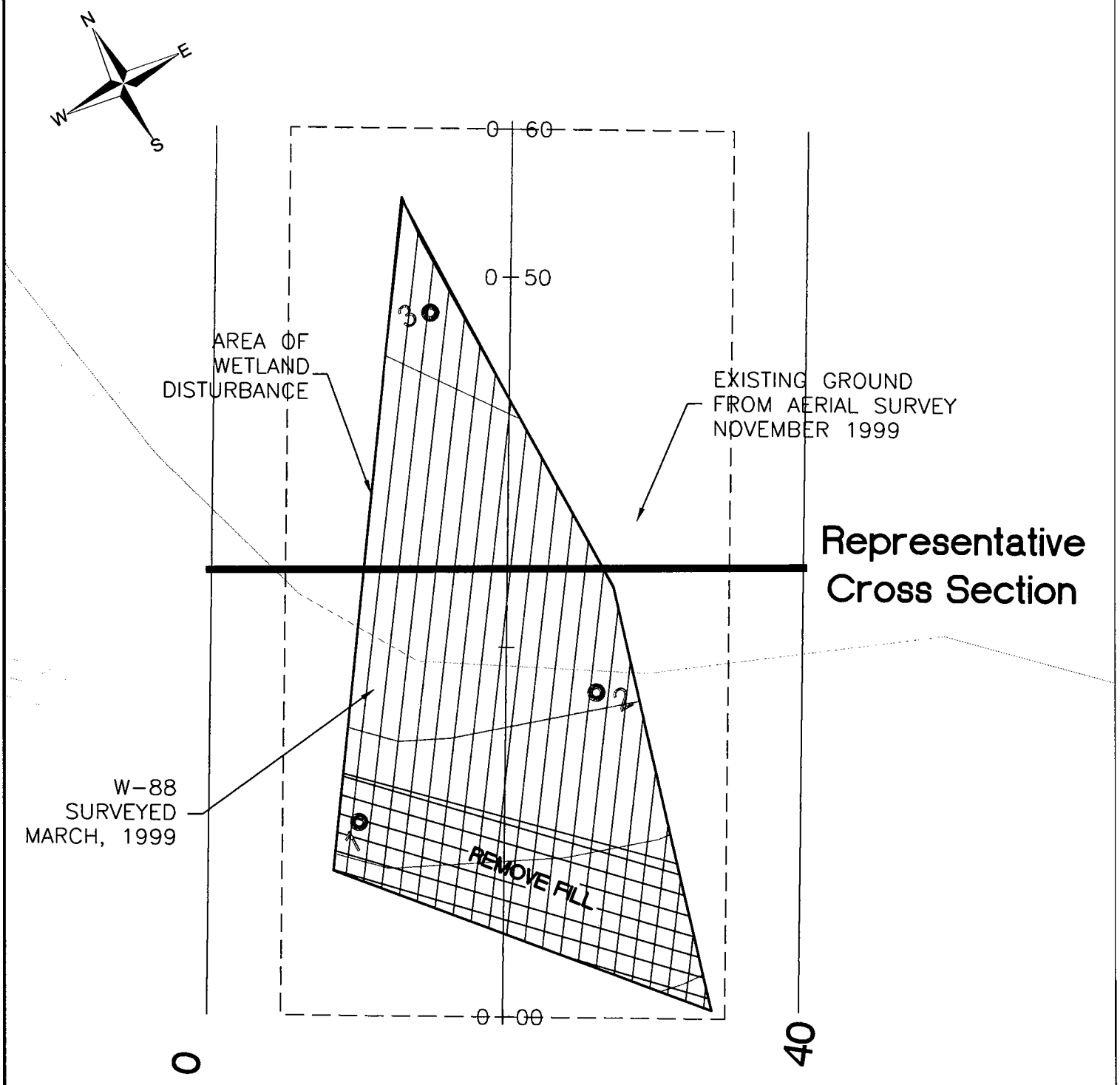
Fig. 3A-G8: Restoration Site
Sheet 1 of 2

Fig. 3B-G8: Representative Grading Cross Section



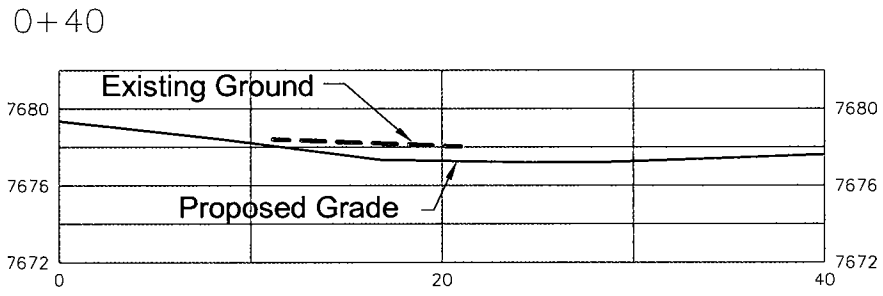
LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maiele, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G8-9-11.dwg	SCALE: 1"=10' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3B-G8: Representative Grading Cross Section Sheet 2 of 2

Fig. 3A-G9: Restoration Site



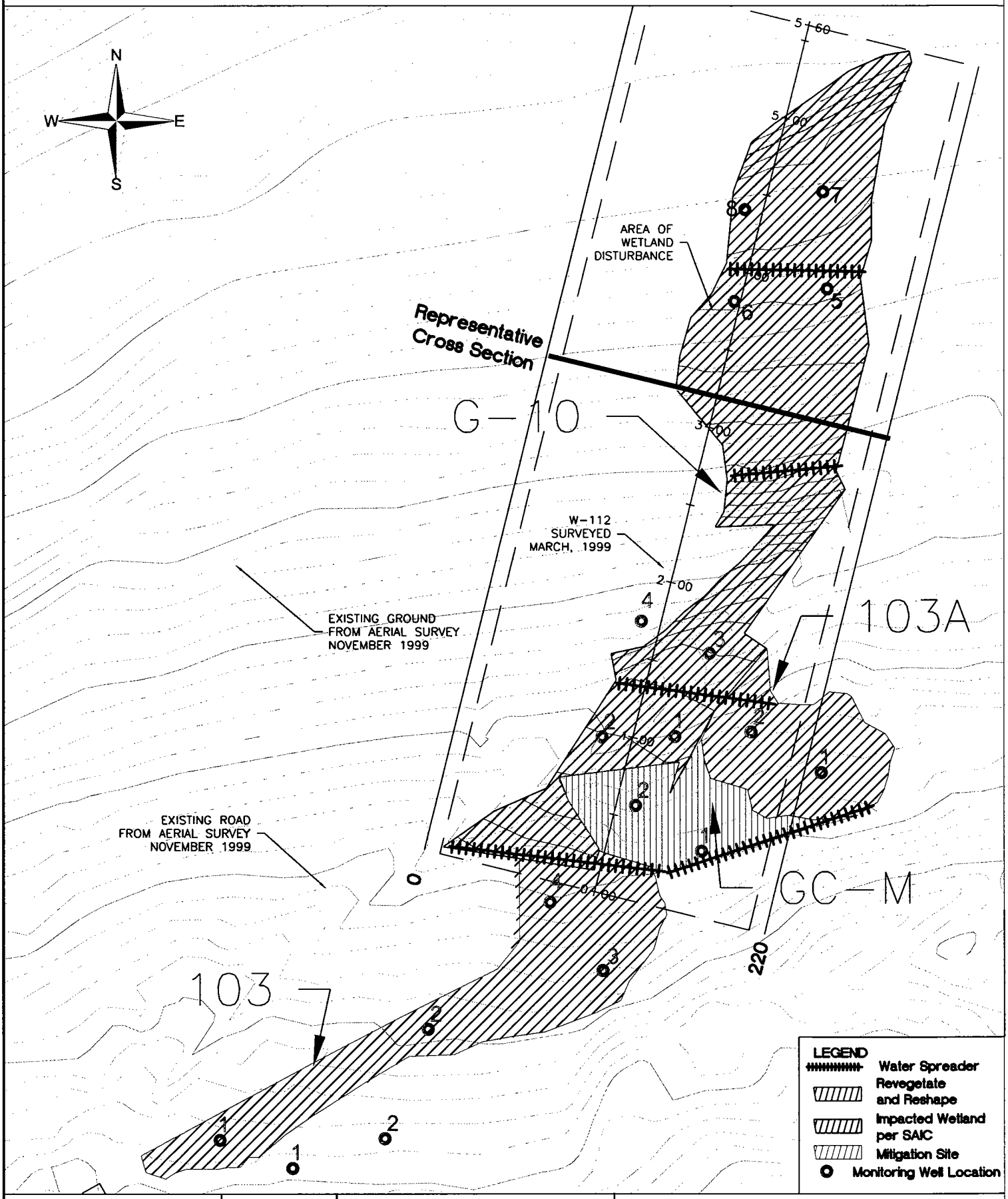
LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maiele, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G8-9-11.dwg	SCALE: 1"=10' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3A-G9: Restoration Site Sheet 1 of 2

Fig. 3B-G9: Representative Grading Cross Section



LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maielre, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G8-9-11.dwg	SCALE: 1"=10' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3B-G9: Representative Grading Cross Section Sheet 2 of 2

Fig. 3A-G10: Restoration Site



LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

Base map data supplied by Morrison Maierle, Inc.
PLOTTED DATE: Jun/10/2004
G10-103-103A-GCM.dwg

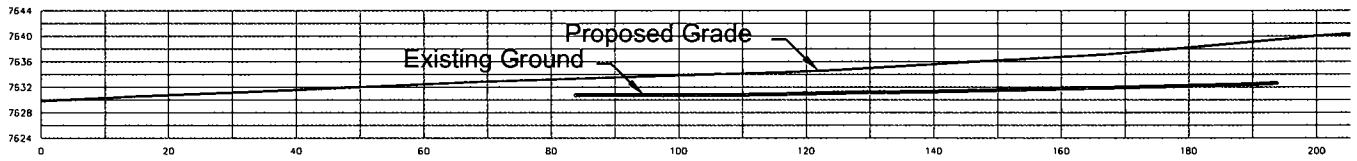
SCALE:	1"=80'
LOCATION:	Big Sky, MT
PROJ NO:	140347
DRAWN:	MW/RA
DATE:	04/09/03

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

Fig. 3A-G10: Restoration Site
Sheet 1 of 2

Fig. 3B-G10: Representative Grading Cross Section

3+20



LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

Base map data supplied by Morrison Maielre, Inc.

PLOTTED DATE: Jun/10/2004

L:\140347 Golf Course\dwg\Final\Figure 3's\G10-103-103 Detail.dwg

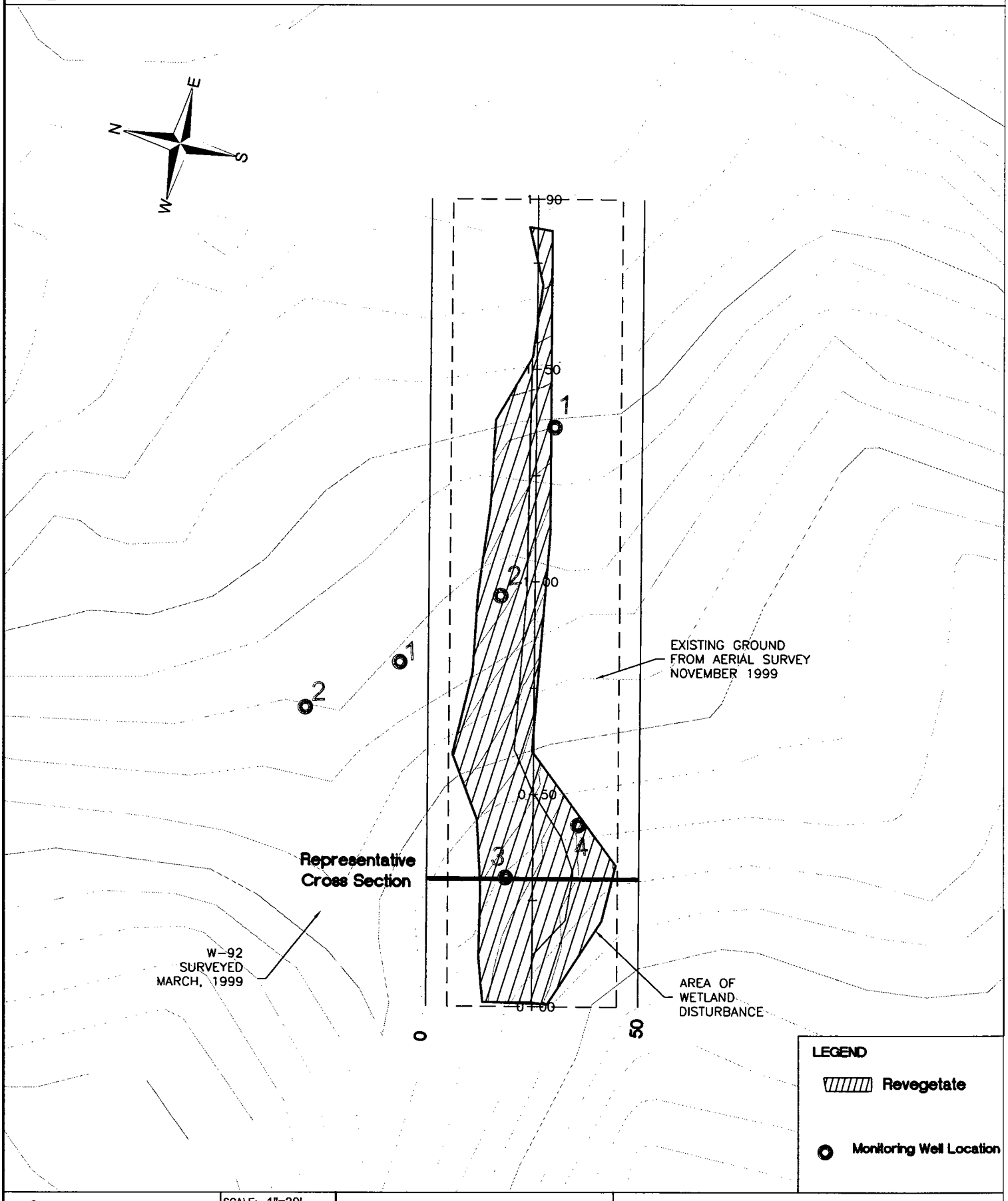
SCALE:	1"=30'
LOCATION:	Big Sky, MT
PROJ NO:	140347
DRAWN:	MW/RA
DATE:	04/09/03

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

Fig. 3B-G10: Representative Grading Cross Section

Sheet 2 of 3

Fig. 3A-G11: Restoration Site



LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

Base map data supplied by Morrison Maierle, Inc.

PLOTTED DATE: Jun/10/2004

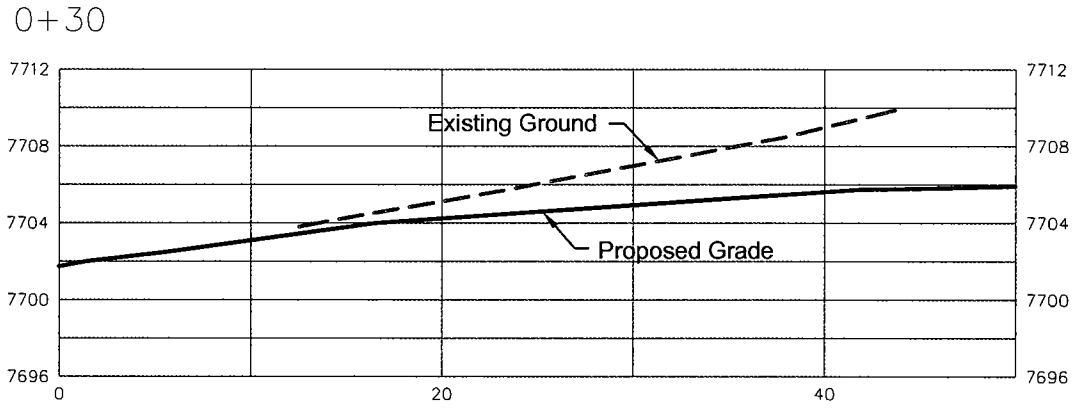
L:\140347 Golf Course\dwg\Final\Figure 3's\G11-12-fig3.dwg

SCALE:	1"=30'
LOCATION:	Big Sky, MT
PROJ NO:	140347
DRAWN:	MW/RA
DATE:	04/09/03

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

Fig. 3A-G11: Restoration Site
Sheet 1 of 2

Fig. 3B-G11: Representative Grading Cross Section



LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

Base map data supplied by Morrison Maierle, Inc.

PLOTTED DATE: Jun/10/2004

L:\140347 Golf Course\dwg\Final\Figure 3's\G11-12-fig3.dwg

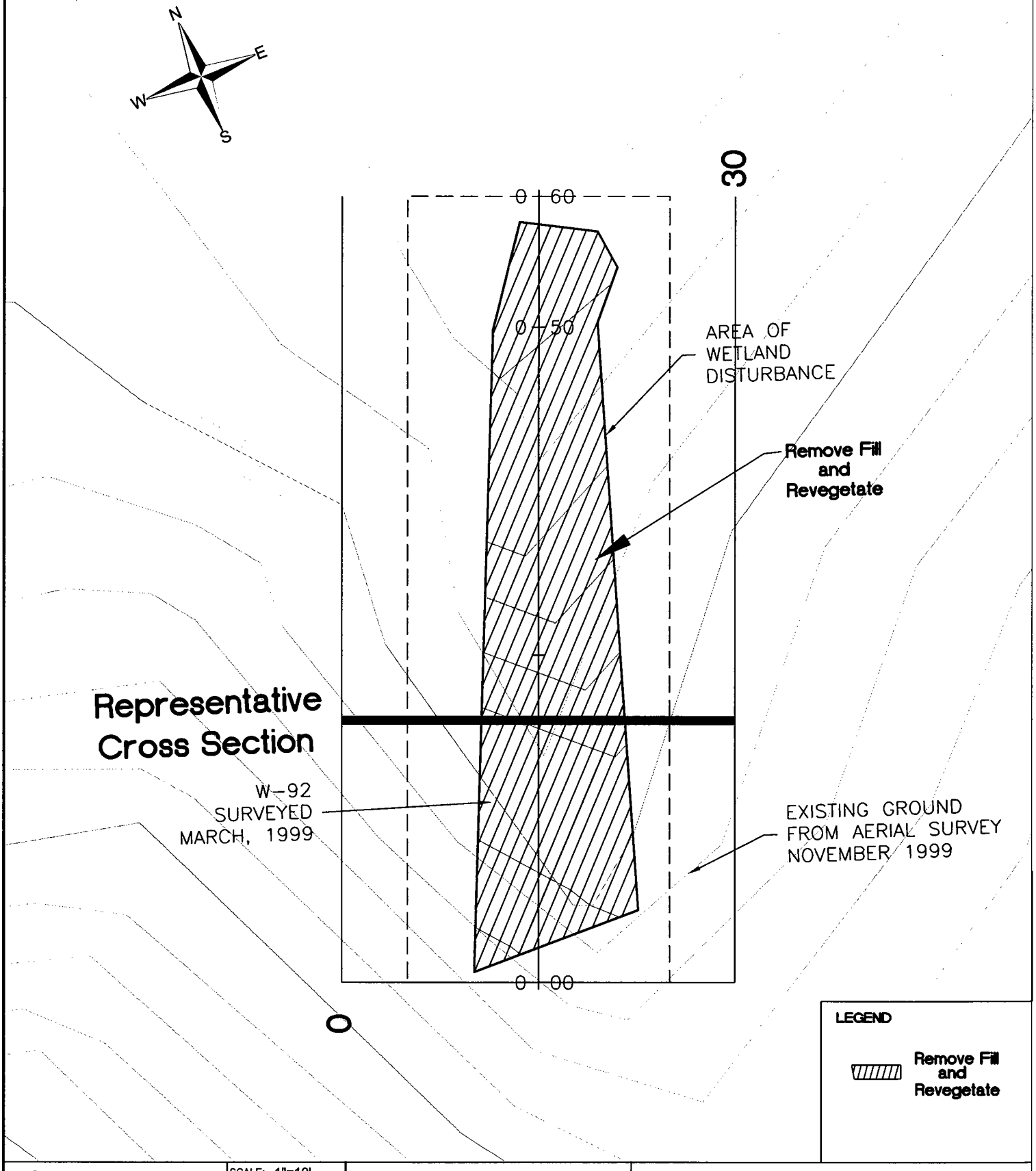
SCALE:	1"=10'
LOCATION:	Big Sky, MT
PROJ NO:	140347
DRAWN:	MW/RA
DATE:	04/09/03

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

Fig. 3B-G11: Representative Grading Cross Section

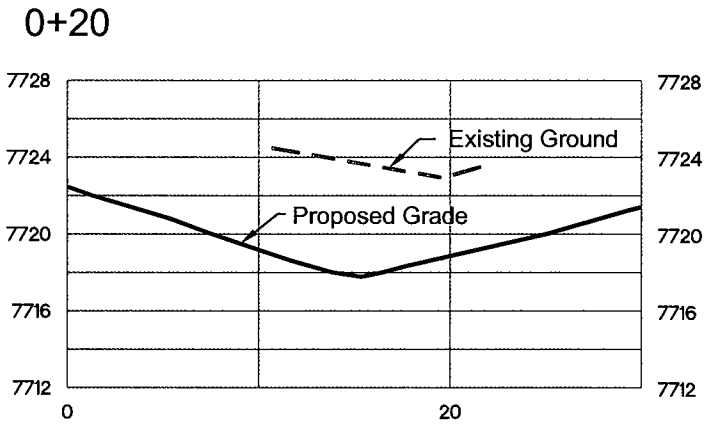
Sheet 2 of 2

Fig. 3A-G12: Restoration Site



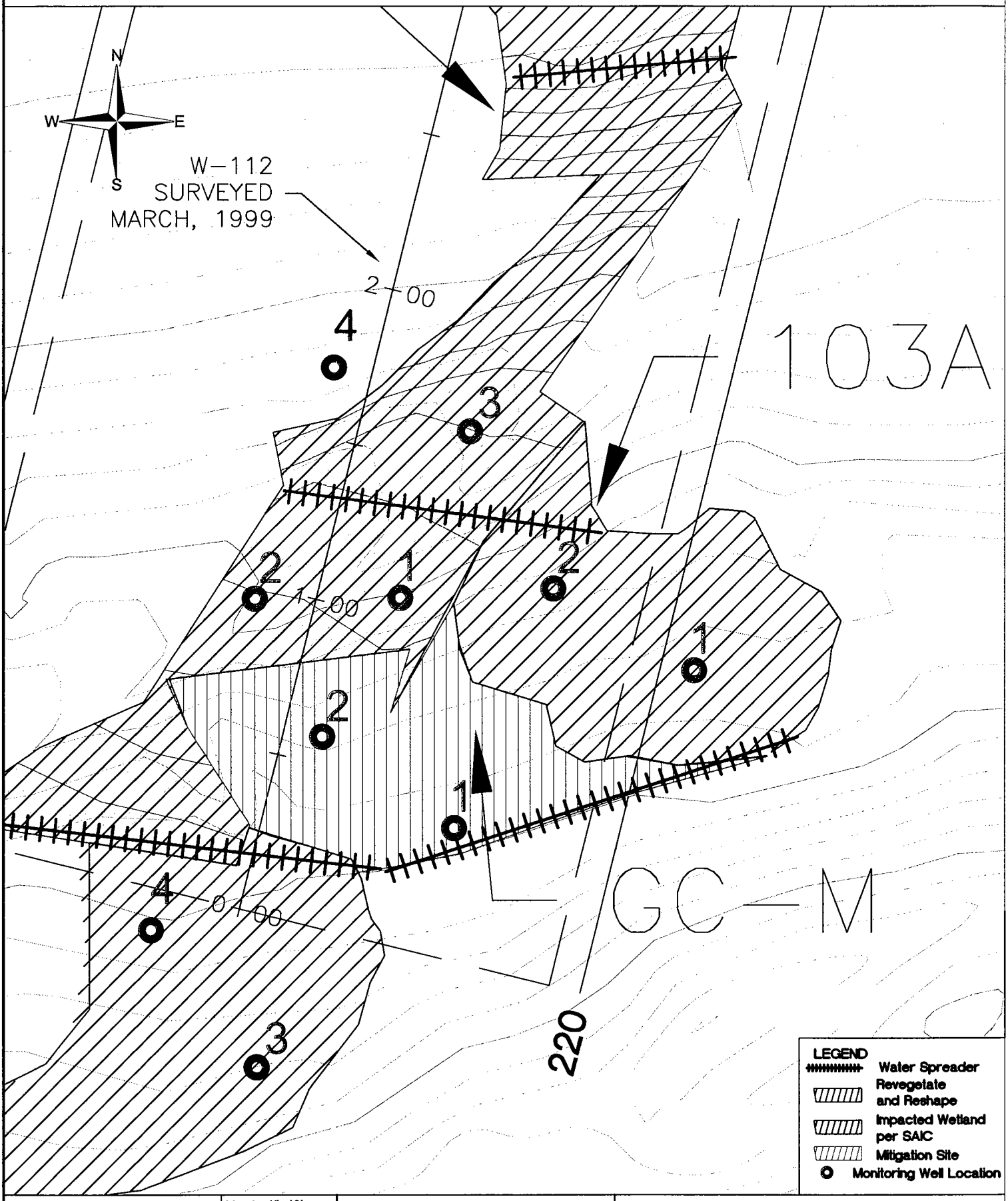
LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maierle, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G11-12-fig3.dwg	SCALE: 1"=10' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3A-G12: Restoration Site Sheet 1 of 2

Fig. 3B-G12: Representative Grading Cross Section



LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maielre, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G11-12-fig3.dwg	SCALE: 1"=10' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3B-G12: Representative Grading Cross Section Sheet 2 of 2

Fig. 3C-GC-M: Restoration Site



LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

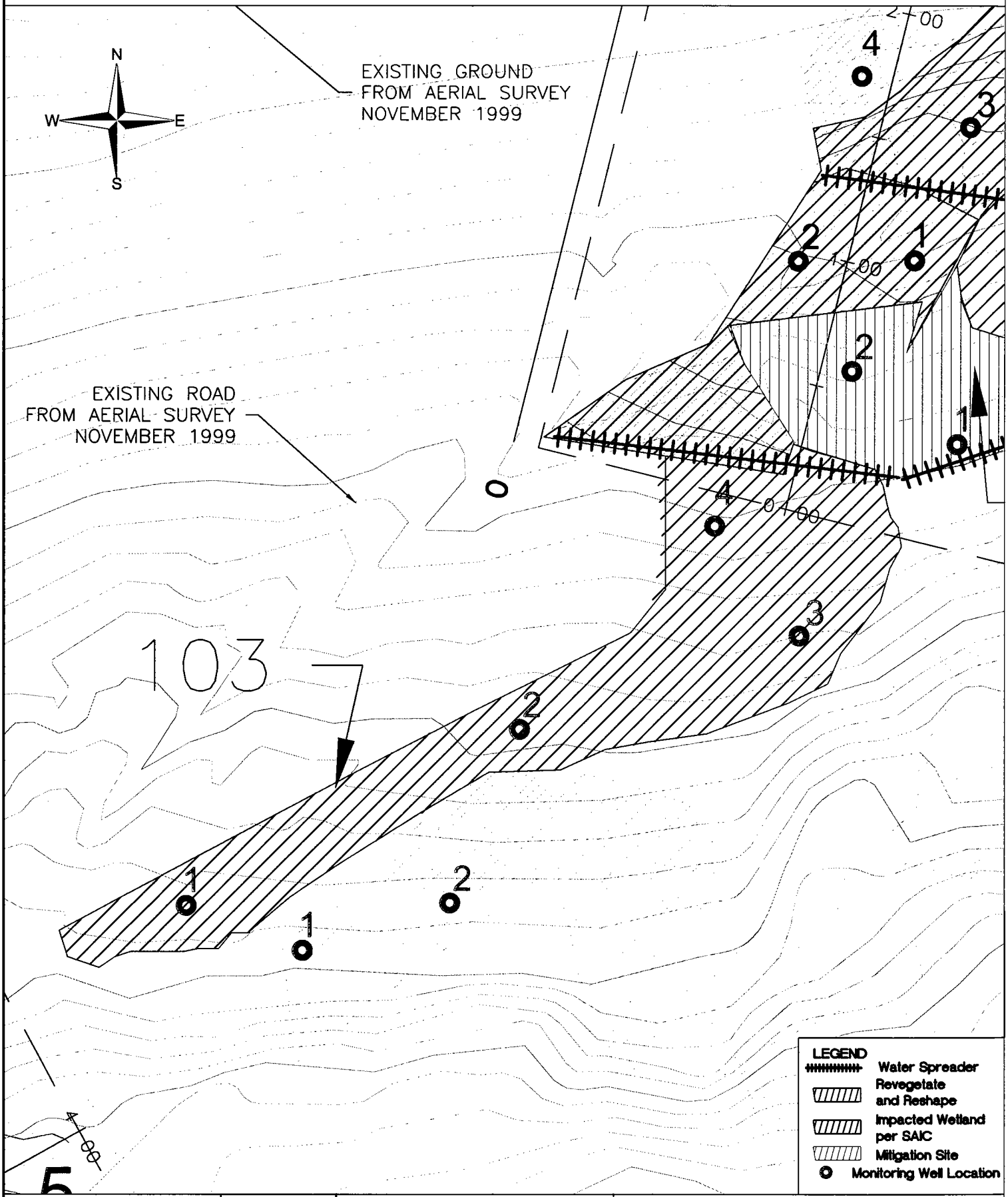
Base map data supplied by Morrison Maielre, Inc.
PLOTTED DATE: Jun/10/2004
L:\140347 Golf Course\dwg\Final\Figure 3's\G10-103-103A.dwg

SCALE:	1"=40'
LOCATION:	Big Sky, MT
PROJ NO:	140347
DRAWN:	MW/RA
DATE:	04/09/03

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

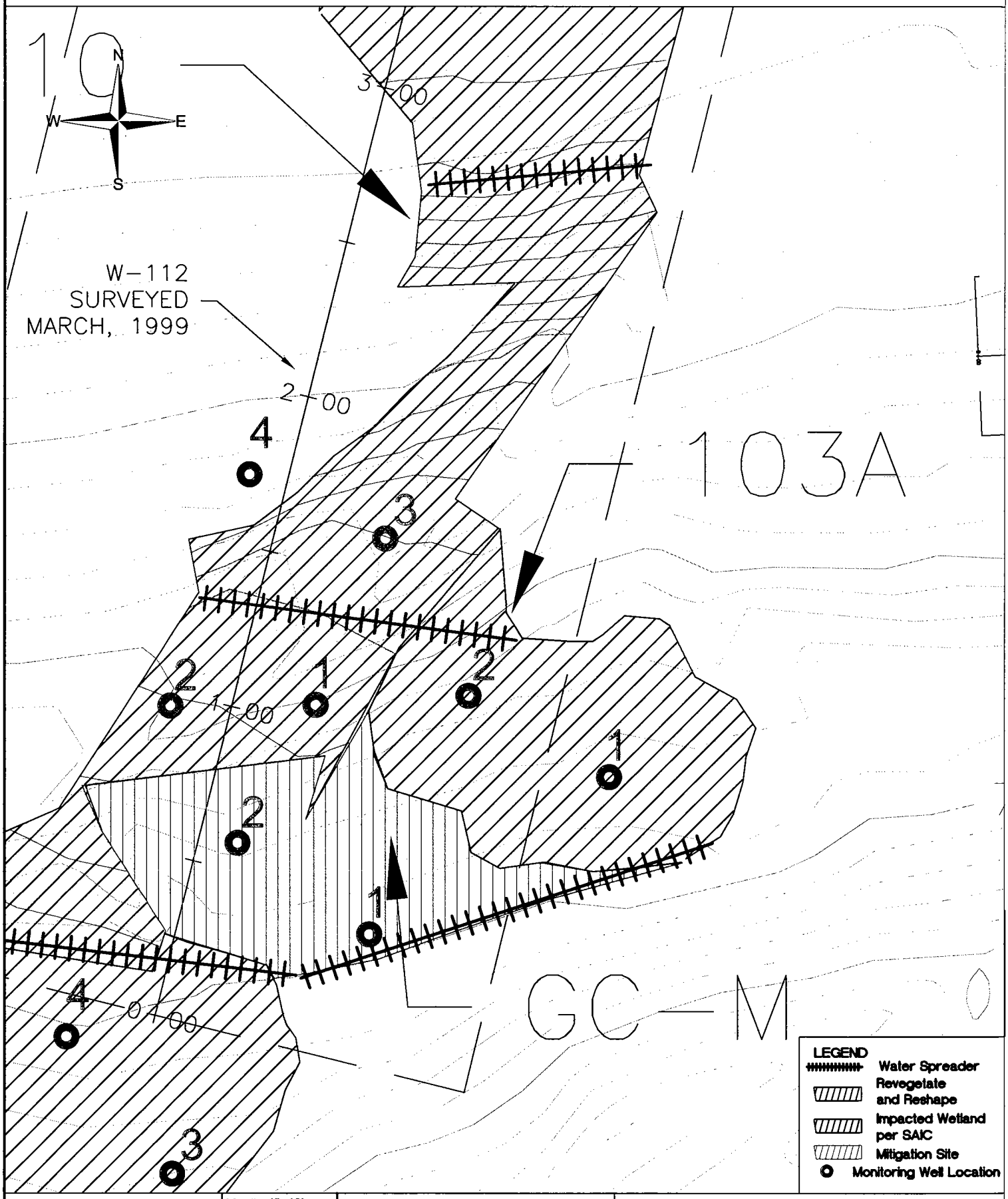
Fig. 3C-GC-M: Restoration Site
Sheet 1 of 1

Fig. 3A-103: Restoration Site



LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807	SCALE: 1"=50'	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3A-103: Restoration Site Sheet 1 of 1
Base map data supplied by Morrison Maielre, Inc.	LOCATION: Big Sky, MT		
PLOTTED DATE: Jun/10/2004	PROJ NO: 140347		
G10-103-103A-GCM.dwg	DRAWN: MW/RA		
	DATE: 04/09/03		

Fig. 3A-103A: Restoration Site



LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

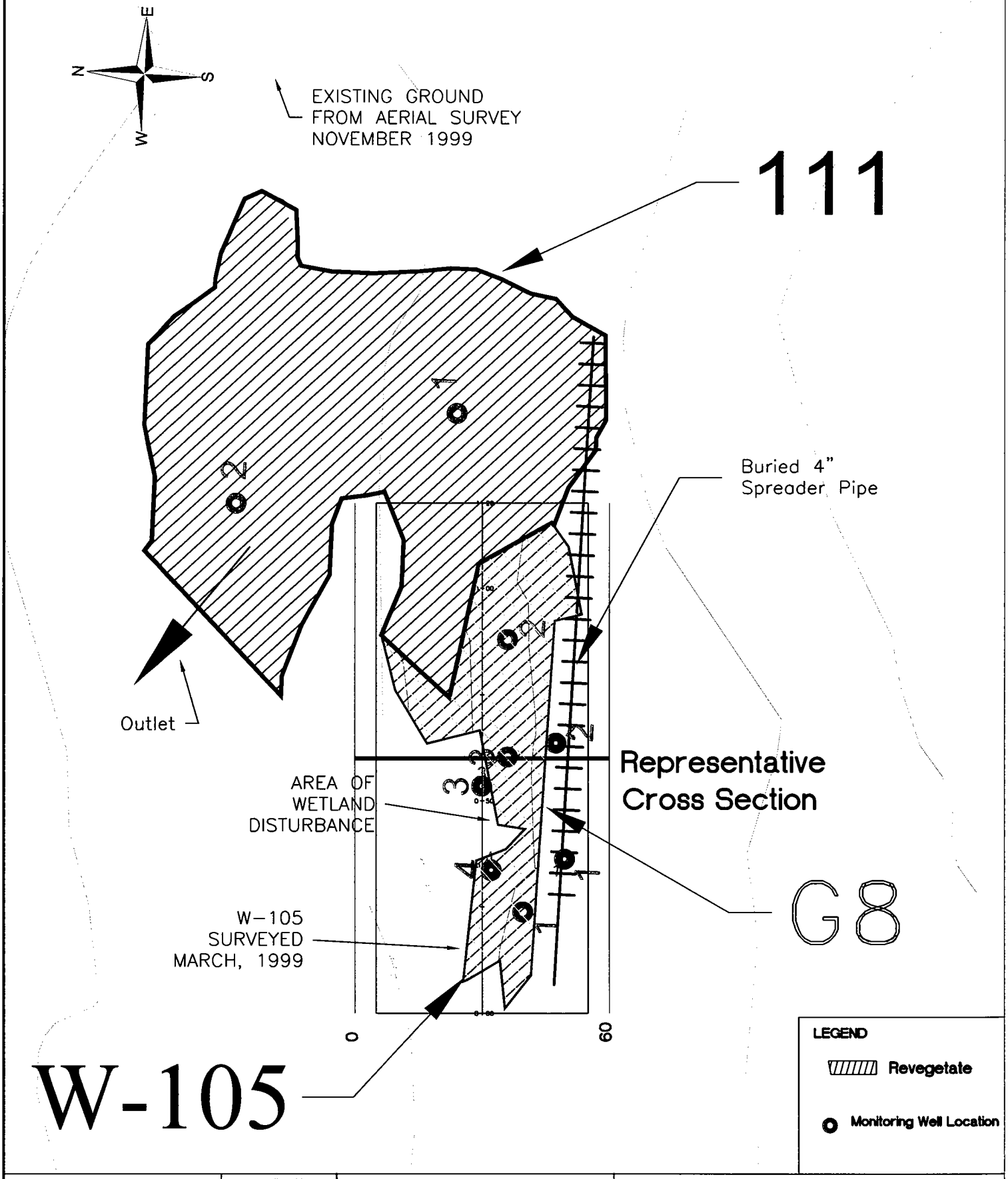
Base map data supplied by Morrison Maierle, Inc.
PLOTTED DATE: Jun/10/2004
G10-103-103A-GCM.dwg

SCALE:	1"=40'
LOCATION:	Big Sky, MT
PROJ NO:	140347
DRAWN:	MW/RA
DATE:	04/09/03

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

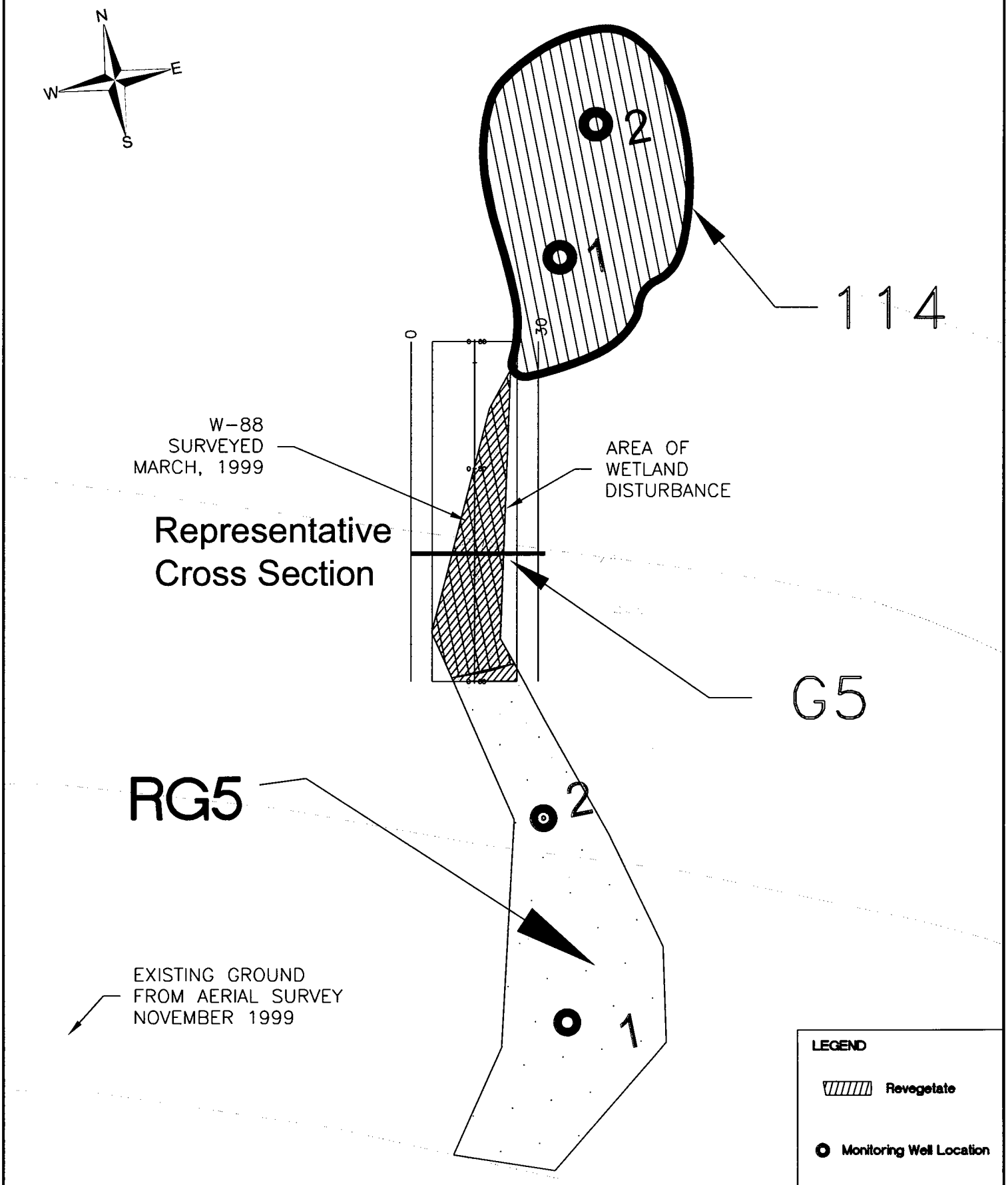
Fig. 3A-103A: Restoration Site
Sheet 1 of 1

Fig. 3A-111: Restoration Site



LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maierle, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G8-9-111.dwg	SCALE: 1"=30' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3A-111: Restoration Site Sheet 1 of 1

Fig. 3A-114: Restoration Site



LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 Base map data supplied by Morrison Maierle, Inc. PLOTTED DATE: Jun/10/2004 L:\140347 Golf Course\dwg\Final\Figure 3's\G5-G6-114.dwg	SCALE: 1"=30' LOCATION: Big Sky, MT PROJ NO: 140347 DRAWN: MW/RA DATE: 04/09/03	YMC GOLF COURSE WETLAND RESTORATION PROJECT	Fig. 3A-114: Restoration Site Sheet 1 of 1

APPENDIX A

LAND & WATER

Appendix A

GOLF COURSE RESTORATION SITES (LARGE MAP)

Yellowstone Mountain Club Golf Course
Wetland Restoration Project

LAND & WATER

APPENDIX B

LAND & WATER

Appendix B

EXAMPLE PHOTOGRAPHS OF RESTORATION SITES AND REFERENCE WETLANDS

Yellowstone Mountain Club Golf Course
Wetland Restoration Project

LAND & WATER

Photo 1: View looking north at G1 along reconstructed channel.

Photo 2: View looking north at G2. Arrow points to sediment to be removed.

Photo 3: View looking south at G3NE (foreground).

Photo 4: View looking west at G3SW (foreground).

Photo 5: View looking north at G4. Arrow points to sediment to be removed.

Photo 6: View looking north at G5. Arrows point to sediment to be removed.

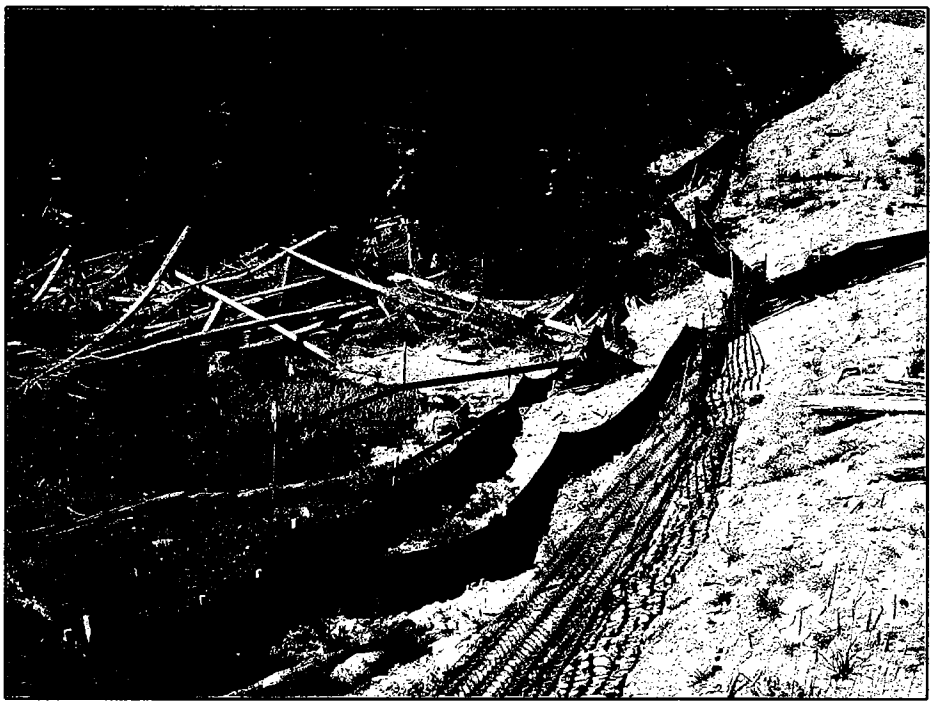


Photo 7: View looking west at G6. Arrow points to sediment to be removed.

Photo 8: View looking northeast at G8 with approximate area of restoration.

Photo 9: View looking southwest at G9 with approximate area of restoration.

Photo 10: View looking northeast at G11 (foreground).

Photo 11: View looking south at Reference Wetland RG2G3G4.

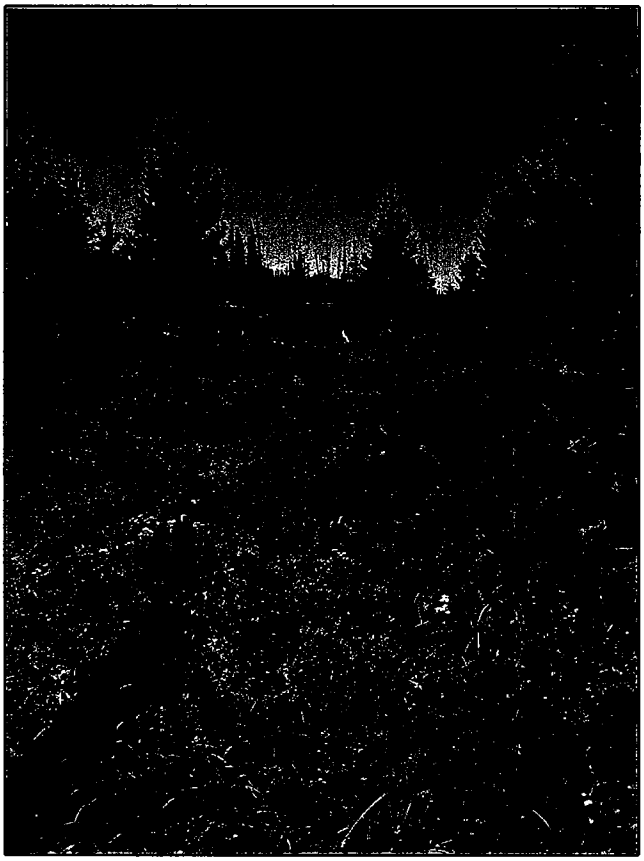


Photo 12: View looking south of upper half of Reference Wetland G5.

Photo 13: View looking northwest of Reference Wetland G6.

Photo 14: View looking northeast of Reference Wetland G11.

APPENDIX C

LAND & WATER

Appendix C

REFERENCE WETLAND AREA VEGETATION DATA

Yellowstone Mountain Club Golf Course
Wetland Restoration Project

LAND & WATER

Vegetation Coverage Data from Nine Golf Course Reference Areas for Plants Considered for Revegetation

Scientific Name	Common Name	RG1	RG2/G3/G4	RG5	RG6	RG7	RG8/G9/G10/G12	RG11	Average Cover	Constancy[1]
Aster foliaceus	leafy-bracted aster	3	10	0.5	0.5	10	10	10	6.3	100
Calamagrostis canadensis	blue-joint reedgrass	40	3	0.5	0.5	3	10	3	8.6	100
Carex utriculata	beaked sedge		3	3	10	0.5	10		5.3	71
Equisetum arvense	field horsetail	3	50	20	60	10	50	40	33	100
Habenaria dilatata	leafy white orchid		0.5	0.5		0.5	0.5	0.5	0.5	71
Heracleum lanatum	cow-parsnip	3	3	0.5	0.5	3	20	3	4.7	100
Juncus ensifolius	Drummonds rush	3	3	30	3				9.8	57
Ledum glandulosum	Labrador tea							0.5	0.5	14
Mimulus guttatus	common monkey-flower		3	10		0.5		3	4.1	57
Poa alpina	alpine bluegrass				0.5				0.5	14
Phleum alpinum	alpine timothy	3	0.5		10	3	3	3	3.8	85
Ribes lacustre	prickly currant		3	0.5	0.5	3	3	3	2.2	85
Saxifraga arguta	brook saxifrage				0.5		3	10	4.5	43
Senecio triangularis	arrow-leaf groundsel		10	3	0.5	10	20	20	10.6	85
Trollius laxus	American globeflower		3		0.5	3	3		2.4	57

1: Constancy is the % of reference areas with each species present.

Vegetation Coverage Data Summary from 40 Golf Course Wetlands for Plants Considered for Revegetation

Scientific Name	Common Name	Average Cover	Constancy[1]
Aster foliaceus	Leafy-bracted aster	4.48	90
Calamagrostis canadensis	Blue-joint reedgrass	20	93
Carex aquatilis	Water sedge	0.5	7
Carex utriculata	Beaked sedge	15	21
Equisetum arvense	Field horsetail	12	79
Habenaria dilatata	Leafy white orchid	1	34
Heracleum lanatum	Cow-parsnip	5	66
Juncus ensifolius	Drummonds rush	5	41
Ledum glandulosum	Labrador tea	13	10
Mimulus guttatus	Common monkey-flower	1.75	7
Phleum alpinum	Alpine timothy	5	62
Poa alpina	Alpine bluegrass	0.5	7
Ribes lacustre	Prickly currant	3	66
Saxifraga arguta	Brook saxifrage	4	14
Senecio triangularis	Arrow-leaf groundsel	6	79
Trollius laxus	American globeflower	3	52

1: Constancy is the % of golf course wetlands with each species present

LAND & WATER

Reference Wetland Area RG1

Scientific Name	Common Name	% Cover	Status
Abies lasiocarpa	sub-alpine fir	3	FACU
Achillea millefolium	yarrow	3	FACU
Astragalus alpinus	alpine milkvetch	0.5	FAC-
Bromus ciliatus	fringed brome	0.5	FAC+
Calamagrostis canadensis	blue-joint reedgrass	40	FACW+
Castilleja miniata	scarlet Indian-paintbrush	0.5	FAC
Cirsium arvense	Canada thistle	3	FACU+
Elymus glaucus	blue wild-rye	10	FACU
Epilobium angustifolium	fireweed	0.5	FACU+
Equisetum arvense	field horsetail	3	FAC
Erigeron peregrinus	wandering fleabane	3	FACW
Fragaria virginiana	Virginia strawberry	10	-
Galium boreale	northern bedstraw	0.5	FACU
Geranium richardsonnii	white geranium	0.5	FACU+
Geum macrophyllum	large-leaf avens	3	FACW+
Juncus confusus	Colorado rush	0.5	FAC
Juncus regelii	Regel's rush	3	FACW
Lonicera utahensis	Utah honeysuckle	0.5	FACU+
Phleum alpinum	alpine timothy	3	FAC
Picea engelmannii	Engelmann's spruce	10	FAC
Pinus contorta	lodgepole pine	3	FAC-
Poa spp.	bluegrass	0.5	-
Salix spp.	Willow	0.5	-
Taraxacum officinale	dandelion	0.5	FACU
Thalictrum occidentale	western meadowrue	0.5	FACU
Trifolium spp.	clover	3	-

Reference Area Wetland RG2G4

Scientific Name	Common Name	% Cover	Status
Abies lasiocarpa	sub-alpine fir	10	FACU
Actaea rubra	baneberry	3	-
Agrostis exarata	spike bentgrass	0.5	FACW
Allium brevistylum	short-style onion	0.5	-
Bromus ciliatus	fringed brome	3	FAC+
Calamagrostis canadensis	blue-joint reedgrass	3	FACW+
Carex phaeocephala	mountain-hare sedge	0.5	FACU
Carex utriculata	beaked sedge	3	OBL
Deschampsia elongata	slender hairgrass	0.5	FACW-
Dracocephalum parviflorum	American dragonhead	0.5	FACU
Elymus glaucus	blue wild-rye	3	FACU
Epilobium ciliatum	hairy willow-herb	10	FACW-
Equisetum arvense	field horsetail	60	FAC
Erigeron peregrinus	wandering fleabane	3	FACW
Fragaria virginiana	Virginia strawberry	3	-
Geranium richardsonnii	white geranium	0.5	FACU+
Geum macrophyllum	large-leaf avens	0.5	FACW+
Glyceria elata	tall manna grass	0.5	FACW+
Habenaria dilatata	leafy white orchid	0.5	FACW+
Heracleum lanatum	cow-parsnip	10	FAC
Juncus ensifolius	Drummond's rush	3	FACW
Mimulus guttatus	common monkey-flower	3	OBL
Parnassia fimbriata	fringed grass-of-parnassus	0.5	OBL
Phleum alpinum	alpine timothy	0.5	FAC
Phleum pratense	timothy	0.5	FACU
Picea engelmannii	Engelmann's spruce	10	FAC
Poa spp.	bluegrass	0.5	-
Ribes hudsonianum	Hudson Bay currant	0.5	OBL
Ribes lacustre	prickly currant	0.5	FAC+
Salix bebbiana	Bebb willow	0.5	FACW
Senecio triangularis	arrow-leaf groundsel	3	FACW+
Trifolium spp.	clover	0.5	-
Trollius laxus	American globeflower	0.5	OBL

Reference Area Wetland RG3

Scientific Name	Common Name	% Cover	Status
Abies lasiocarpa	sub-alpine fir	40	FACU
Achillea millefolium	yarrow	0.5	FACU
Actaea rubra	baneberry	0.5	-
Agrostis exarata	spike bentgrass	0.5	FACW
Agrostis spp.	bentgrass	0.5	-
Allium brevistylum	short-style onion	3	-
Aquilegia flavescens	yellow columbine	0.5	-
Arnica longifolia	seep-spring arnica	0.5	FACW
Astragalus alpinus	alpine milkvetch	0.5	FAC-
Aster conspicuus	showy aster	3	-
Aster spp.	aster	3	NULL
Bromus ciliatus	fringed brome	0.5	FAC+
Calamagrostis rubescens	pinegrass	0.5	-
Carex microptera	small-wing sedge	0.5	FAC
Carex phaeocephala	mountain-hare sedge	3	FACU
Cirsium arvense	Canada thistle	0.5	FACU+
Elymus glaucus	blue wild-rye	10	FACU
Epilobium angustifolium	fireweed	0.5	FACU+
Epilobium ciliatum	hairy willow-herb	3	FACW-
Equisetum arvense	field horsetail	30	FAC
Erigeron peregrinus	wandering fleabane	10	FACW
Fragaria virginiana	Virginia strawberry	3	-
Geranium richardsonnii	white geranium	3	FACU+
Geum macrophyllum	large-leaf avens	3	FACW+
Glyceria elata	tall manna grass	0.5	FACW+
Habenaria dilatata	leafy white orchid	0.5	FACW+
Heracleum lanatum	cow-parsnip	0.5	FAC
Juniperus communis	common juniper	0.5	-
Juncus ensifolius	Drummond's rush	0.5	FACW
Juncus regelii	Regel's rush	3	FACW
Ligusticum spp.	lovage	0.5	-
Linnaea borealis	twinflower	0.5	FACU-
Lonicera utahensis	Utah honeysuckle	0.5	FACU+
Luzula parviflora	small-flower woodrush	0.5	FAC-
Mimulus guttatus	common monkey-flower	3	OBL
Osmorhiza chilensis	mountain sweet cicely	0.5	-
Parnassia fimbriata	fringed grass-of-parnassus	0.5	OBL
Phleum alpinum	alpine timothy	0.5	FAC
Phleum pratense	timothy	0.5	FACU
Picea engelmannii	Engelmann's spruce	20	FAC
Poa interior	woods bluegrass	0.5	FACU
Ribes lacustre	prickly currant	3	FAC+
Salix bebbiana	Bebb willow	0.5	FACW
Salix lutea	yellow willow	0.5	OBL

Reference Area Wetland RG3 cont.

Scientific Name	Common Name	% Cover	Status
Senecio dimorphophyllus	Payson's groundsel	0.5	-
Senecio triangularis	arrow-leaf groundsel	10	FACW+
Spiraea betulifolia	white spirea	0.5	NI
Streptopus amplexifolius	twisted stalk	0.5	FAC-
Taraxacum officinale	Dandelion	3	FACU
Thalictrum occidentale	western meadowrue	0.5	FACU
Trifolium spp.	Clover	3	-
Trollius laxus	American globeflower	3	OBL
Vaccinium scoparium	grouse whortleberry	0.5	FACU-
Zigadenus elegans	mountain death-camas	0.5	FAC+

Reference Area Wetland RG5

Scientific Name	Common Name	% Cover	Status
Abies lasiocarpa	sub-alpine fir	3	FACU
Achillea millefolium	yarrow	0.5	FACU
Agrostis exarata	spike bentgrass	0.5	FACW
Aster conspicuus	showy aster	0.5	-
Bromus ciliatus	fringed brome	0.5	FAC+
Calamagrostis canadensis	blue-joint reedgrass	0.5	FACW+
Carex utriculata	beaked sedge	3	OBL
Cirsium arvense	Canada thistle	3	FACU+
Deschampsia elongata	slender hairgrass	0.5	FACW-
Elymus glaucus	blue wild-rye	3	FACU
Epilobium angustifolium	fireweed	0.5	FACU+
Epilobium ciliatum	hairy willow-herb	0.5	FACW-
Equisetum arvense	field horsetail	20	FAC
Erigeron peregrinus	wandering fleabane	0.5	FACW
Fragaria virginiana	Virginia strawberry	0.5	-
Geum macrophyllum	large-leaf avens	3	FACW+
Glyceria elata	tall manna grass	3	FACW+
Habenaria dilatata	leafy white orchid	0.5	FACW+
Heracleum lanatum	cow-parsnip	0.5	FAC
Hordeum brachyantherum	meadow barley	0.5	FACW
Juncus ensifolius	Drummond's rush	3	FACW
Juncus regelii	Regel's rush	30	FACW
Linaria vulgaris	butter-n-eggs	0.5	-
Mimulus guttatus	common monkey-flower	10	OBL
Parnassia fimbriata	fringed grass-of-parnassus	0.5	OBL
Phleum pratense	timothy	10	FACU
Picea engelmannii	Engelmann's spruce	10	FAC
Pinus contorta	lodgepole pine	20	xx
Ribes lacustre	prickly currant	0.5	FAC+
Salix bebbiana	Bebb willow	3	FACW
Senecio triangularis	arrow-leaf groundsel	3	FACW+
Taraxacum officinale	dandelion	0.5	FACU
Thalictrum occidentale	western meadowrue	0.5	FACU
Trifolium spp.	clover	30	-

Reference Area Wetland RG6

Scientific Name	Common Name	% Cover	Status
Abies lasiocarpa	sub-alpine fir	3	FACU
Achillea millefolium	yarrow	0.5	FACU
Agrostis exarata	spike bentgrass	10	FACW
Allium brevistylum	short-style onion	0.5	-
Astragalus alpinus	alpine milkvetch	0.5	FAC-
Bromus ciliatus	fringed brome	0.5	FAC+
Calamagrostis canadensis	blue-joint reedgrass	0.5	FACW+
Carex microptera	small-wing sedge	0.5	FAC
Carex phaeocephala	mountain-hare sedge	0.5	FACU
Carex utriculata	beaked sedge	10	OBL
Cirsium arvense	Canada thistle	0.5	FACU+
Elymus glaucus	blue wild-rye	0.5	FACU
Epilobium angustifolium	fireweed	0.5	FACU+
Epilobium ciliatum	hairy willow-herb	0.5	FACW-
Equisetum arvense	field horsetail	60	FAC
Erigeron peregrinus	wandering fleabane	0.5	FACW
Fragaria virginiana	Virginia strawberry	10	-
Galium triflorum	sweet-scent bedstraw	0.5	FACU
Geranium richardsonnii	white geranium	0.5	FACU+
Geum macrophyllum	large-leaf avens	3	FACW+
Glyceria elata	tall manna grass	0.5	FACW+
Heracleum lanatum	cow-parsnip	0.5	FAC
Juncus ensifolius	Drummond's rush	0.5	FACW
Juncus regelii	Regel's rush	3	FACW
Luzula parviflora	small-flower woodrush	0.5	FAC-
Parnassia fimbriata	fringed grass-of-parnassus	0.5	OBL
Phleum alpinum	alpine timothy	10	FAC
Phleum pratense	timothy	3	FACU
Pinus contorta	lodgepole pine	3	FAC-
Poa alpina	alpine bluegrass	0.5	FAC
Ribes lacustre	prickly currant	0.5	FAC+
Salix bebbiana	Bebb willow	0.5	FACW
Salix boothii	Booth's willow	0.5	OBL
Salix exigua	sandbar willow	0.5	OBL
Salix lemmonii	Lemmon's willow	0.5	FACW+
Saxifraga arguta	brook saxifrage	0.5	FACW+
Senecio dimorphophyllus	Payson's groundsel	0.5	-
Senecio triangularis	arrow-leaf groundsel	0.5	FACW+
Smilacina stellata	Starry Solomon's-seal	0.5	FAC-
Thelypodium paniculatum	thelypody	0.5	-
Trifolium spp.	clover	10	-
Trollius laxus	American globeflower	0.5	OBL
Zigadenus elegans	mountain death-camas	0.5	FAC+

Reference Area Wetland RG7

Scientific Name	Common Name	% Cover	Status
Abies lasiocarpa	sub-alpine fir	20	FACU
Achillea millefolium	yarrow	3	FACU
Actaea rubra	baneberry	0.5	-
Agrostis exarata	spike bentgrass	10	FACW
Angelica arguta	Lyall's angelica	0.5	FACW
Astragalus alpinus	alpine milkvetch	0.5	FAC-
Aster conspicuus	showy aster	0.5	-
Bromus ciliatus	fringed brome	0.5	FAC+
Calamagrostis canadensis	blue-joint reedgrass	3	FACW+
Carex phaeocephala	mountain-hare sedge	0.5	FACU
Carex utriculata	beaked sedge	0.5	OBL
Cirsium arvense	Canada thistle	3	FACU+
Dactylis glomerata	orchard grass	0.5	FACU
Elymus glaucus	blue wild-rye	10	FACU
Epilobium angustifolium	fireweed	0.5	FACU+
Epilobium ciliatum	hairy willow-herb	3	FACW-
Equisetum arvense	field horsetail	10	FAC
Erigeron peregrinus	wandering fleabane	10	FACW
Fragaria virginiana	Virginia strawberry	3	-
Galium triflorum	sweet-scent bedstraw	0.5	FACU
Geranium richardsonnii	white geranium	3	FACU+
Geum macrophyllum	large-leaf avens	10	FACW+
Glyceria elata	tall manna grass	0.5	FACW+
Habenaria dilatata	leafy white orchid	0.5	FACW+
Heracleum lanatum	cow-parsnip	3	FAC
Juncus ensifolius	Drummond's rush	10	FACW
Mertensia ciliata	streamside bluebells	0.5	FACW+
Mimulus guttatus	common monkey-flower	0.5	OBL
Phleum alpinum	alpine timothy	3	FAC
Phleum pratense	timothy	0.5	FACU
Picea engelmannii	Engelmann's spruce	3	FAC
Pinus contorta	lodgepole pine	0.5	FAC-
Poa palustris	fowl bluegrass	10	FAC
Ribes lacustre	prickly currant	3	FAC+
Senecio triangularis	arrow-leaf groundsel	10	FACW+
Sheperdia canadensis	Canada buffaloberry	0.5	NI
Taraxacum officinale	dandelion	0.5	FACU
Thalictrum occidentale	western meadowrue	0.5	FACU
Trifolium spp.	clover	10	-
Trollius laxus	American globeflower	3	OBL
Veronica americana	American speedwell	0.5	OBL

Reference Area Wetland RG8G10

Scientific Name	Common Name	% Cover	Status
Abies lasiocarpa	sub-alpine fir	10	FACU
Achillea millefolium	yarrow	0.5	FACU
Agoseris aurantiaca	False-dandelion	0.5	FAC
Allium brevistylum	short-style onion	0.5	-
Angelica arguta	Lyall's angelica	3	FACW
Aquilegia flavescens	yellow columbine	0.5	-
Astragalus alpinus	alpine milkvetch	3	FAC-
Bromus ciliatus	fringed brome	0.5	FAC+
Calamagrostis canadensis	Blue-joint reedgrass	10	FACW+
Carex microptera	small-wing sedge	0.5	FAC
Carex neurophora	alpine nerve sedge	3	FACW
Carex phaeocephala	mountain-hare sedge	0.5	FACU
Castilleja miniata	scarlet Indian-paintbrush	0.5	FAC
Cirsium arvense	Canada thistle	0.5	FACU+
Elymus glaucus	Blue wild-rye	10	FACU
Epilobium angustifolium	fireweed	0.5	FACU+
Epilobium ciliatum	hairy willow-herb	3	FACW-
Epilobium paniculatum	autumn willow-herb	0.5	-
Equisetum arvense	Field horsetail	60	FAC
Erigeron peregrinus	wandering fleabane	10	FACW
Fragaria virginiana	Virginia strawberry	3	-
Galium triflorum	sweet-scent bedstraw	0.5	FACU
Geum macrophyllum	large-leaf avens	10	FACW+
Glyceria elata	tall manna grass	0.5	FACW+
Habenaria dilatata	leafy white orchid	0.5	FACW+
Heracleum lanatum	Cow-parsnip	20	FAC
Juncus ensifolius	Drummond's rush	3	FACW
Luzula parviflora	small-flower woodrush	20	FAC-
Parnassia fimbriata	fringed grass-of-parnassus	0.5	OBL
Phleum alpinum	alpine timothy	3	FAC
Phleum pratense	timothy	3	FACU
Picea engelmannii	Engelmann's spruce	20	FAC
Poa palustris	Fowl bluegrass	3	FAC
Poa spp.	bluegrass	0.5	-
Pyrola asarifolia	Pink wintergreen	0.5	FACU
Ribes hudsonianum	Hudson Bay currant	0.5	OBL
Ribes lacustre	prickly currant	3	FAC+
Salix bebbiana	Bebb willow	0.5	FACW
Salix lemmonii	Lemmon's willow	0.5	FACW+
Sambucus racemosa var. melanocarpa	black elderberry	0.5	FACU
Saxifraga arguta	brook saxifrage	3	FACW+
Senecio triangularis	arrow-leaf groundsel	20	FACW+
Smilacina stellata	Starry Solomon's-seal	0.5	FAC-
Taraxacum officinale	dandelion	0.5	FACU

Reference Area Wetland RG8G10 *cont.*

Scientific Name	Common Name	% Cover	Status
Thelypodium paniculatum	western meadowrue	0.5	-
Thalictrum occidentale	thelypody	0.5	FACU
Trifolium spp.	clover	0.5	-
Trollius laxus	American globeflower	3	OBL
Veronica americana	American speedwell	0.5	OBL
Zigadenus elegans	mountain death-camas	3	FAC+

Reference Area Wetland RG9G12

Scientific Name	Common Name	% Cover	Status
Abies lasiocarpa	sub-alpine fir	0.5	FACU
Calamagrostis canadensis	blue-joint reedgrass	3	FACW+
Carex microptera	small-wing sedge	0.5	FAC
Carex phaeocephala	mountain-hare sedge	0.5	FACU
Carex utriculata	Beaked sedge	10	OBL
Cirsium arvense	Canada thistle	3	FACU+
Elymus glaucus	blue wild-rye	10	FACU
Epilobium ciliatum	hairy willow-herb	3	FACW-
Equisetum arvense	field horsetail	3	FAC
Erigeron peregrinus	wandering fleabane	10	FACW
Fragaria virginiana	Virginia strawberry	3	-
Geranium richardsonnii	white geranium	3	FACU+
Geum macrophyllum	large-leaf avens	3	FACW+
Habenaria dilatata	leafy white orchid	0.5	FACW+
Heracleum lanatum	cow-parsnip	30	FAC
Phleum alpinum	alpine timothy	0.5	FAC
Poa palustris	fowl bluegrass	10	FAC
Ribes lacustre	Prickly currant	3	FAC+
Salix bebbiana	Bebb willow	0.5	FACW
Senecio triangularis	arrow-leaf groundsel	10	FACW+
Smilacina stellata	Starry Solomon's-seal	0.5	FAC-
Thalictrum occidentale	western meadowrue	0.5	FACU
Trifolium spp.	Clover	3	-

Reference Area Wetland RG11

Scientific Name	Common Name	% Cover	Status
Abies lasiocarpa	sub-alpine fir	20	FACU
Achillea millefolium	yarrow	0.5	FACU
Agrostis exarata	Spike bentgrass	3	FACW
Allium brevistylum	Short-style onion	0.5	-
Aster conspicuus	showy aster	0.5	-
Bromus carinatus	mountain brome	0.5	-
Bromus ciliatus	fringed brome	3	FAC+
Calamagrostis canadensis	blue-joint reedgrass	3	FACW+
Carex microptera	small-wing sedge	0.5	FAC
Carex phaeocephala	mountain-hare sedge	3	FACU
Cirsium arvense	Canada thistle	3	FACU+
Deschampsia elongata	slender hairgrass	3	FACW-
Elymus glaucus	blue wild-rye	20	FACU
Epilobium angustifolium	fireweed	0.5	FACU+
Epilobium ciliatum	hairy willow-herb	3	FACW-
Epilobium paniculatum	autumn willow-herb	0.5	-
Equisetum arvense	field horsetail	40	FAC
Erigeron peregrinus	wandering fleabane	10	FACW
Fragaria virginiana	Virginia strawberry	3	-
Geranium richardsonnii	white geranium	3	FACU+
Geum macrophyllum	large-leaf avens	10	FACW+
Glyceria elata	tall manna grass	10	FACW+
Habenaria dilatata	leafy white orchid	0.5	FACW+
Heracleum lanatum	cow-parsnip	3	FAC
Juncus ensifolius	Drummond's rush	0.5	FACW
Ledum glandulosum	Labrador tea	0.5	FACW+
Mertensia ciliata	streamside bluebells	10	FACW+
Mimulus guttatus	common monkey-flower	3	OBL
Parnassia fimbriata	fringed grass-of-parnassus	0.5	OBL
Phleum alpinum	alpine timothy	3	FAC
Phleum pratense	timothy	0.5	FACU
Picea engelmannii	Engelmann's spruce	3	FAC
Pinus contorta	lodgepole pine	0.5	FAC-
Poa palustris	flowl bluegrass	3	FAC
Ribes hudsonianum	Hudson Bay currant	0.5	OBL
Ribes lacustre	prickly currant	3	FAC+
Rosa woodsii	wood rose	0.5	FACU
Sambucus racemosa var. melanocarpa	black elderberry	0.5	FACU
Saxifraga arguta	brook saxifrage	10	FACW+
Senecio triangularis	arrow-leaf groundsel	20	FACW+
Smilacina stellata	Starry Solomon's-seal	0.5	FAC-
Trifolium spp.	clover	3	-
Veronica americana	American speedwell	0.5	OBL

APPENDIX D

LAND & WATER

Appendix D

GRADING PLANS—(*Under separate cover*)

Yellowstone Mountain Club Golf Course
Wetland Restoration Project

LAND & WATER

GRADING PLAN DESCRIPTION

The grading plan for this restoration project consists of a planview and cross-sections for each restoration site. Each respective planview shows stationing, in feet, through the wetland or Water of the United States. This stationing is designated in the conventional engineering format of 0+00, 0+20, 0+50, etc. Under this nomenclature convention, the number before the plus sign is in hundred-foot increments and the number after the plus sign is in one-foot increments. The grading plan provides cross-sections at 10-foot intervals along and perpendicular to the stationing line. The cross-sections show the existing ground from a 2001 GPS survey. Proposed grade is the same ground surface as the pre-disturbance grade. The pre-disturbance contours were determined from a 1999 aerial survey (meaning topographic photogrammetry performed on aerial photos).

To perform the actual excavation, a surveyor will stake out the existing ground with cut and/or fill markers so that equipment operators know where the pre-disturbance surface is anticipated to be. This activity is referred to as "grade staking" and is a conventional method of ensuring accurate excavation or earth placement. YMC will utilize surveyors and equipment operators that are familiar with this process.

Recognizing that there may be some inherent limitations in the 1999 aerial survey, a soil scientist with experience in wetland restoration will be on site during excavation to guide equipment operators. With this expertise on hand, the excavation work will be more likely to result in truly restored surface contours and subsurface permeability. Excavation oversight will also allow for optimal use of the more productive soils on site.

Index of Grading Cross Section Plan Sheets

LAND & WATER

YELLOWSTONE MOUNTAIN CLUB
GOLF COURSE WETLAND RESTORATION PROJECT

Revised Restoration Plan -- June 2004

APPENDIX D: GRADING PLANS

Prepared for:

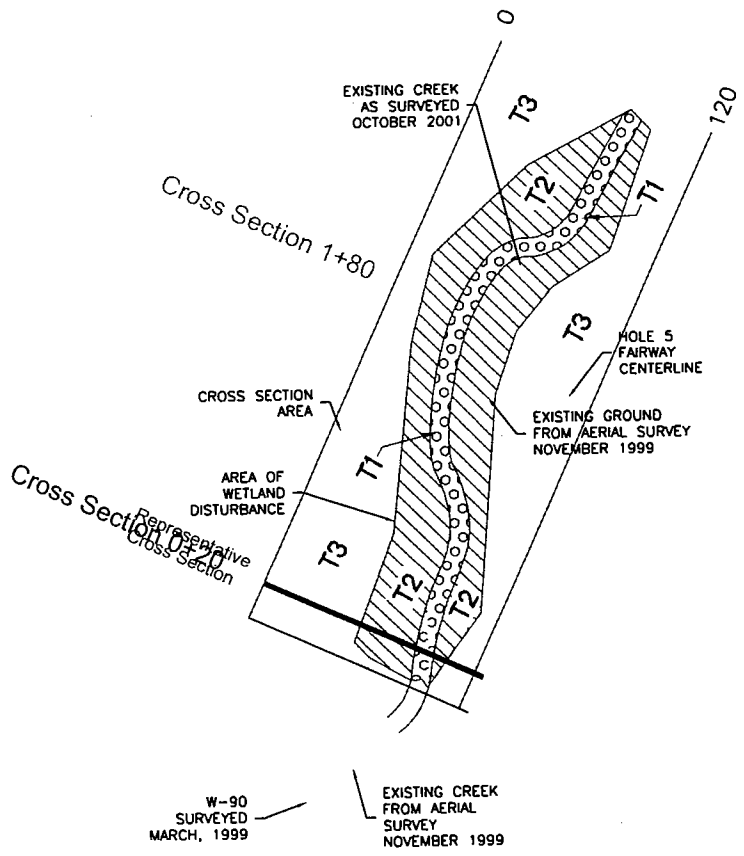
YELLOWSTONE MOUNTAIN CLUB
PO Box 161097
Big Sky, Montana 59716

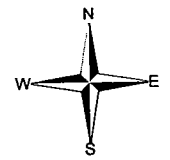
Prepared by:

LAND & WATER CONSULTING, INC.
PO Box 8254
Missoula, Montana 59807

Project No: 140347

Sheet A-1: Wetland G-1 Grading Plan





SCALE 1"= 100ft

SCALE: 1" =100ft	DRAWN BY: RAA	CHECKED BY: P.C.	LAND & WATER CONSULTING, INC.
PROJECT NUMBER: 1402-7	DATE: 7-29-02	FINAL APPROVAL: P.C.	CLIENT: YMC
LOCATION: Big Sky, Montana	FILENAME: COVER-G-PLOT-LW.dwg	FIELD WORK: KIT	DRAWN BY: KW
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1	CHECKED BY:
	REVISIONS # -		DATE: DATE
			SCALE: NOTED
			PROJ #: PROJECT

MORRISON MAIERLE, INC.

YMC
GOLF COURSE WETLAND RESTORATION PROJECT

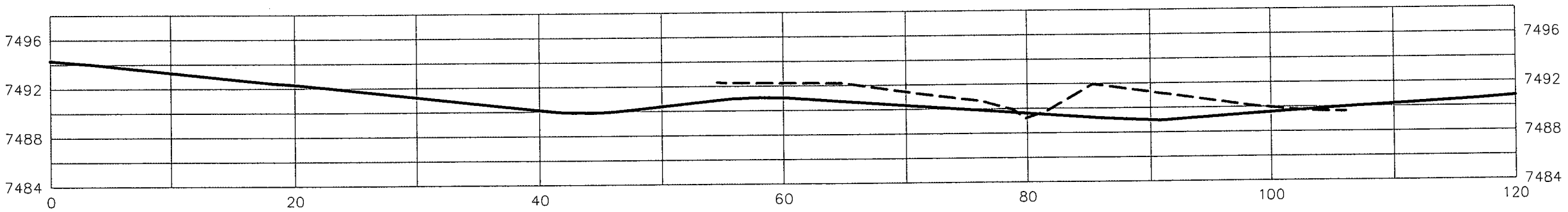
PLOTTED DATE: Jun/07/2004
DRAWING NAME: L:\1402-7 Golf Course\dwg\Wetland Plan\G1-PLAN.dwg
SHEET ___ PAGE OF ___ T-PAGE

Sht. A-1

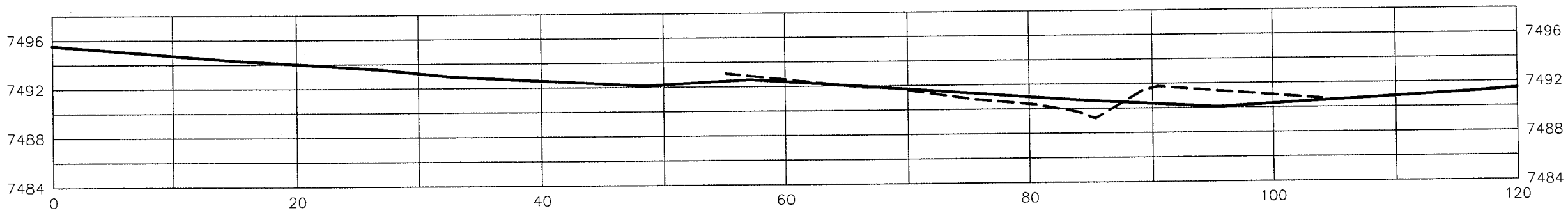
Sheet A-2: Wetland G-1 Grading Cross Sections

SCALE 1"= 10ft

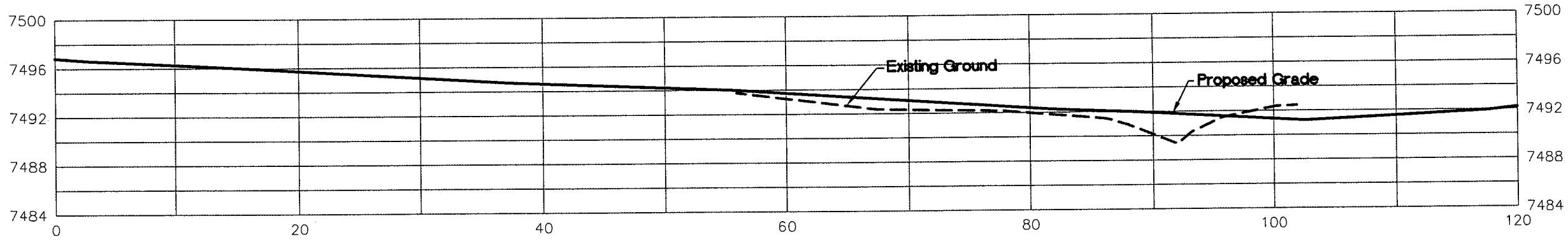
0+30



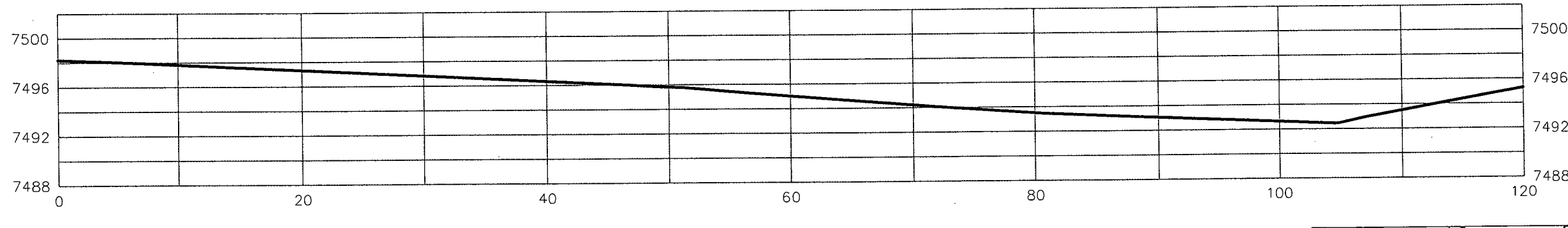
0+20



0+10



0+00

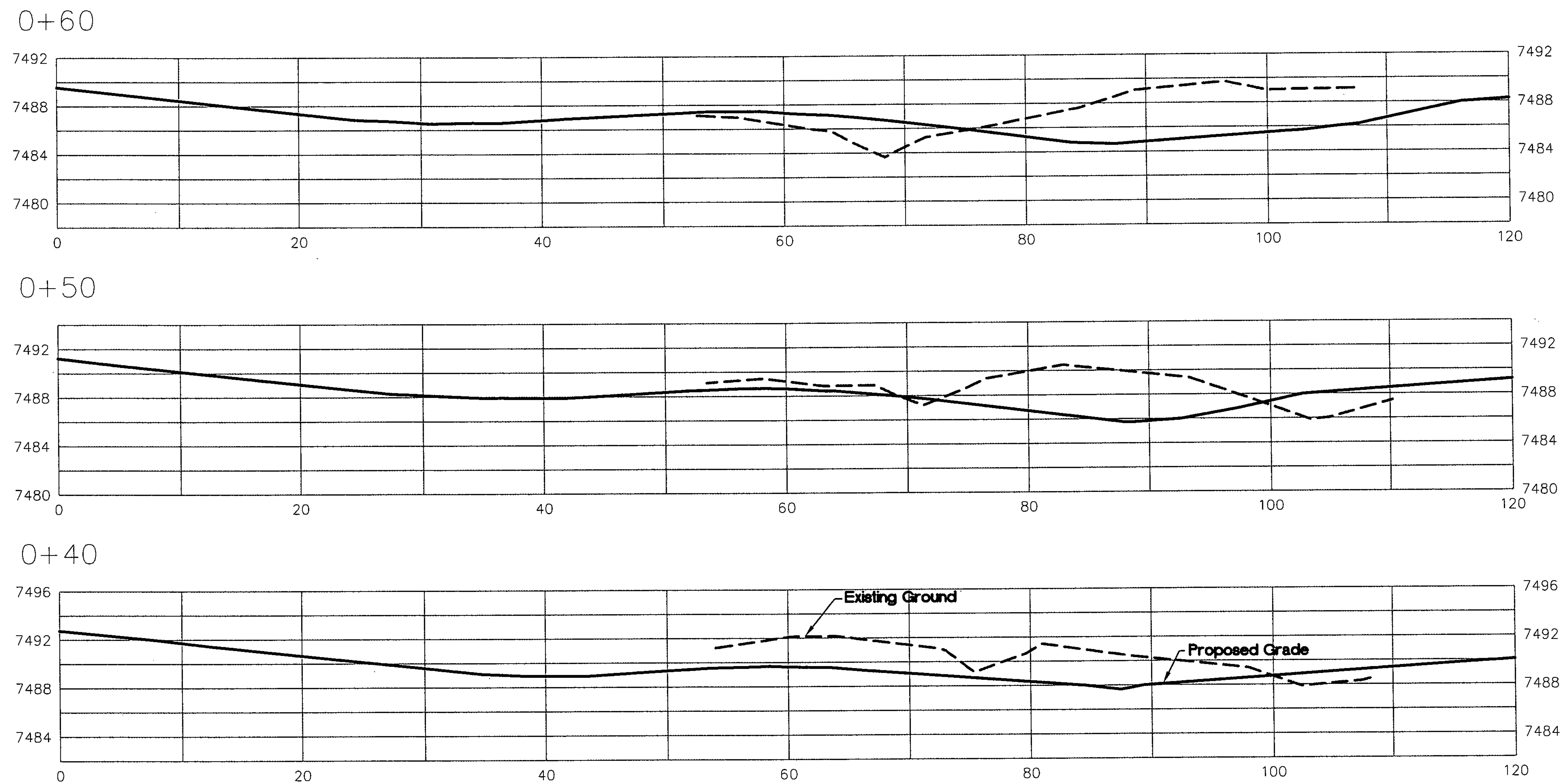


LAND & WATER CONSULTING, INC. P.O. BOX 6898 Missoula, MT 59807		MORRISON MAIERLE, Inc. An Employee-Owned Company	YMC GOLF COURSE WETLAND RESTORATION PROJECT
SCALE: 1" = 10ft	DRAWN BY: RAA	CHECKED BY: P.C.	
PROJECT NUMBER: 140347	DATE: 5-29-02	FINAL APPROVAL: P.C.	CLIENT: CLIENT
LOCATION: Big Sky, Montana	FILENAME: COVER-G-PLOT-LW.dwg		FIELD WORK: FIELD
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1	DRAWN BY: D-BY
	REVISIONS: -		CHECKED BY: C-BY
			DATE: DATE
			SCALE: SCALE
			PROJ. # PROJECT
			PLOTTED DATE: Jun/07/2004
			DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G1-P
			SHEET PAGE OF 1-PAGE

A-2

Sheet A-3: Wetland G-1 Grading Cross Sections

SCALE 1"= 10ft



SCALE: 1" =10ft	DRAWN BY: RAA	CHECKED BY: P.C.	YMC GOLF COURSE WETLAND RESTORATION PROJECT
PROJECT NUMBER: 140347	DATE: 5-29-02	FINAL APPROVAL: P.C.	CLIENT: CLIENT
LOCATION: Big Sky, Montana	FILENAME: COVER-G-PLOT-LW.dwg		PLOTTED DATE: Jun/07/2004
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1	A-3
	REVISION# -		

LAND & WATER CONSULTING, INC.

MORRISON MAIERLE, INC.

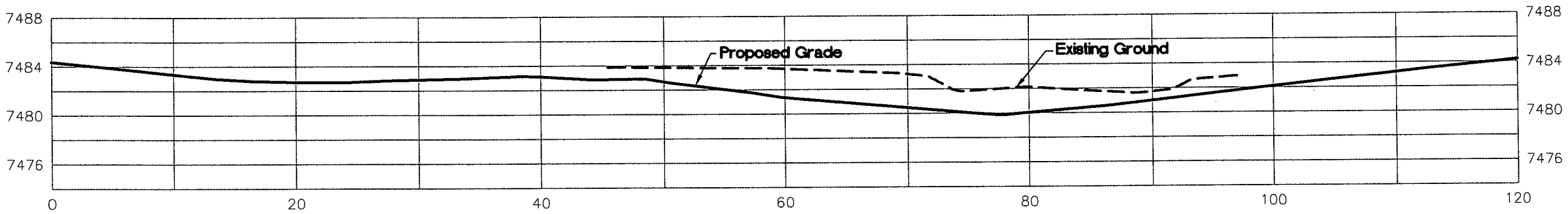
FIELD WORK: FIELD DATE: DATE
DRAWN BY: D-BY SCALE: SCALE
CHECKED BY: C-BY PROJ #: PROJECT

DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G1-PLOT-LW.dwg
SHEET PAGE OF T-PAGE

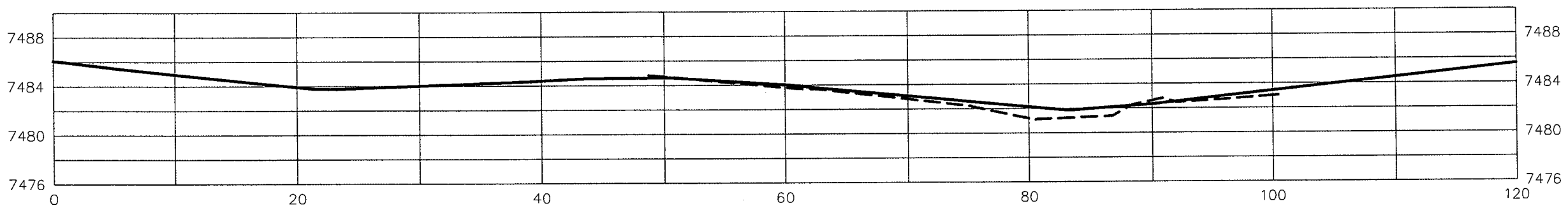
Sheet A-4: Wetland G-1 Grading Cross Sections

SCALE 1"= 10ft

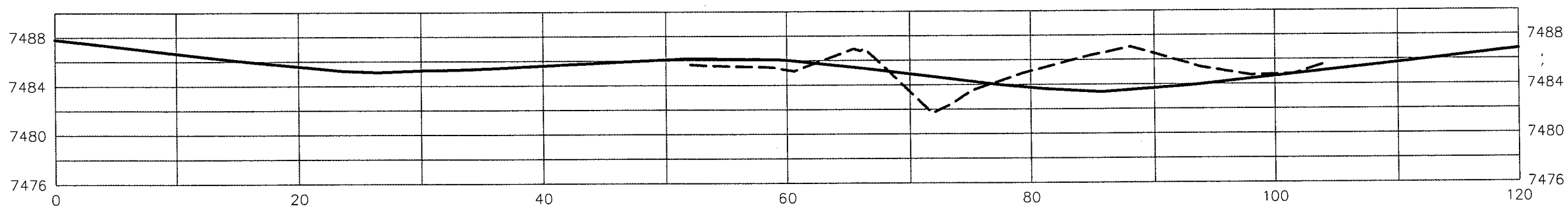
0+90



0+80



0+70



LAND & WATER CONSULTING, INC.
P.O. BOX 4556
BOZEMAN, MT 59772

MORRISON MAIERLE, INC.

SCALE: 1" = 10ft	DRAWN BY: RAA	CHECKED BY: P.C.
PROJECT NUMBER: 140147	DATE: 5-29-02	FINAL APPROVAL: P.C.
LOCATION: Big Sky, Montana	FILENAME: COVER-G-PLOT-LW.dwg	
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1
	REVISIONS# -	

CLIENT: YMC
FIELD WORK: KIT
DRAWN BY: KW
CHECKED BY:
DATE: DATE
SCALE: NOTED
PROJ. #:PROJECT

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

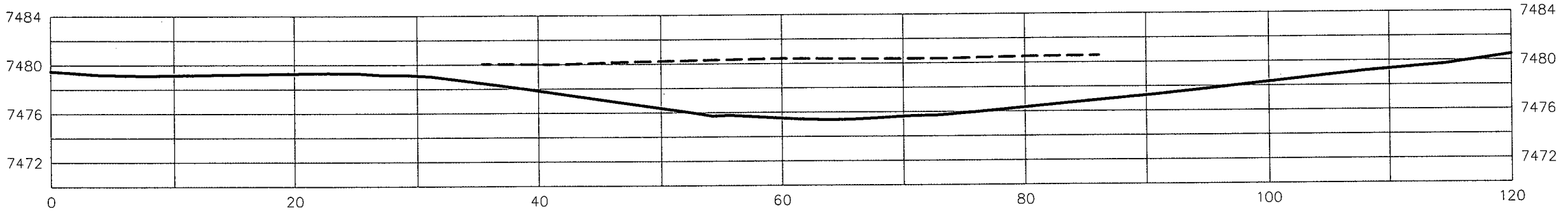
PLOTTED DATE: Jun/07/2004
DRAWING NAME: LV\140147 Golf Course\dwg\grading Plan\G1-PLOT-LW.dwg
SHEET PAGE OF T-PAGE

A-4

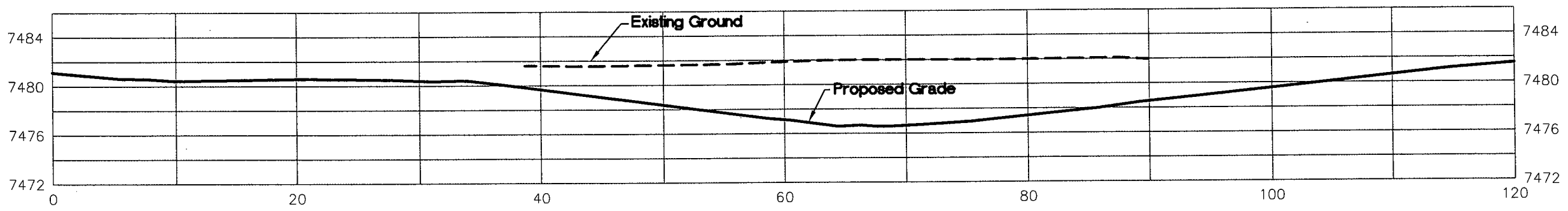
Sheet A-5: Wetland G-1 Grading Cross Sections

SCALE 1"= 10ft

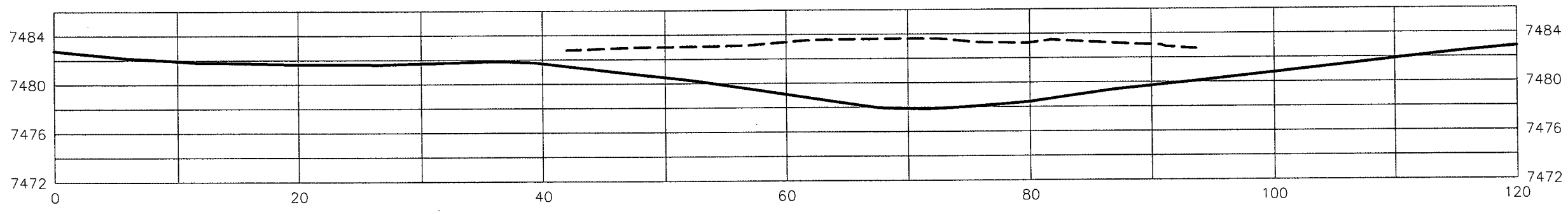
1+20



1+10



1+00



SCALE: 1" =10ft	DRAWN BY: RAA	CHECKED BY: P.C.	LAND & WATER CONSULTING, INC. P.O. BOX 8954 Missoula, MT 59807
PROJECT NUMBER: 140347	DATE: 5-29-02	FINAL APPROVAL: P.C.	CLIENT: YMC
LOCATION: Big Sky, Montana	FILENAME: COVER-G-PLOT-LW.dwg		FIELD WORK: KIT
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1	DRAWN BY: KW
	REVISION# -		CHECKED BY: C-BY

MORRISON MAIERLE, Inc.
A Professional Consulting Solutions

DATE: DATE
SCALE: NOTED
PROV. # PROJECT

YMC GOLF COURSE WETLAND RESTORATION PROJECT

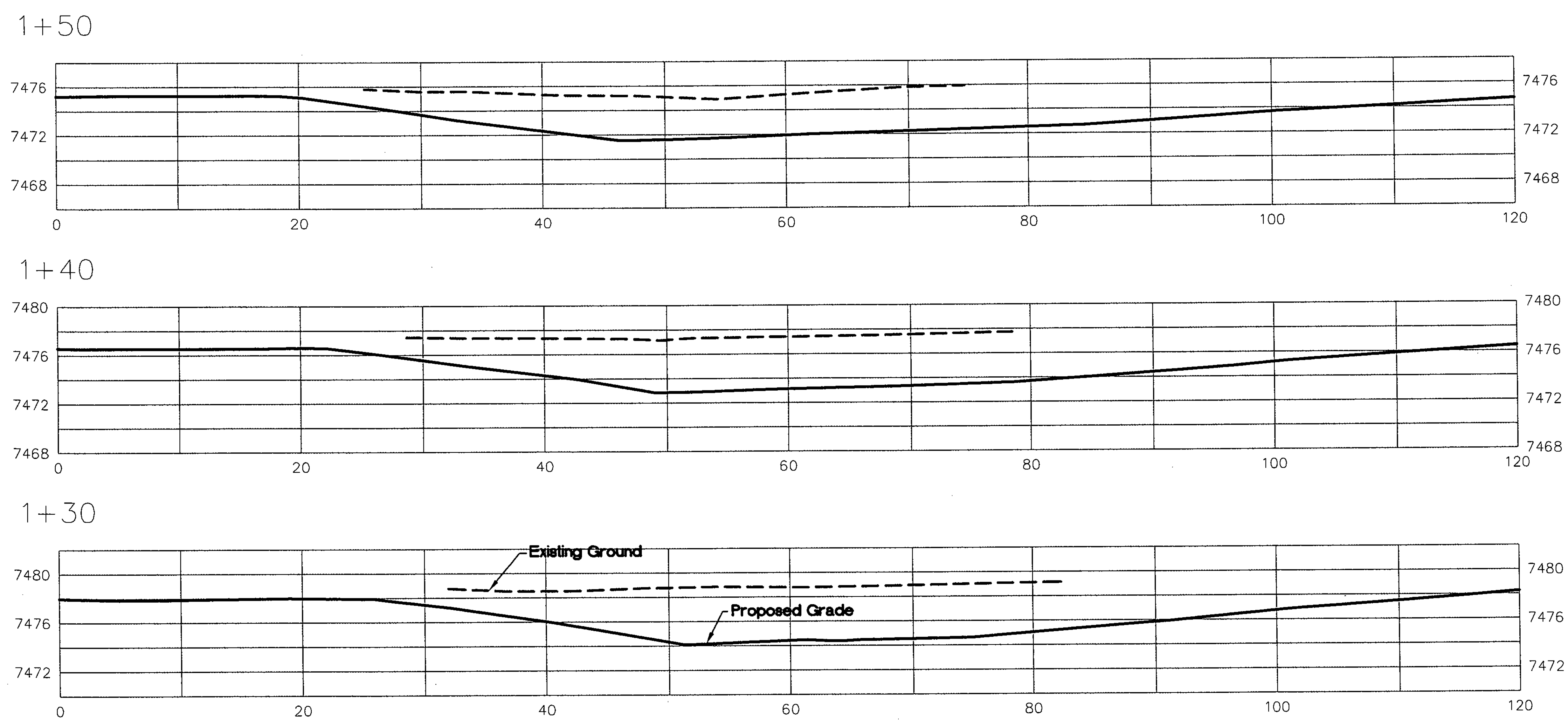
PLOTTED DATE: Jun/07/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\01-Plot

A-5

SHEET PAGE OF T-PAGE

Sheet A-6: Wetland G-1 Grading Cross Sections

SCALE 1"= 10ft



YMC
GOLF COURSE WETLAND
RESTORATION PROJECT
A-6

MORRISON MAIERLE, Inc.

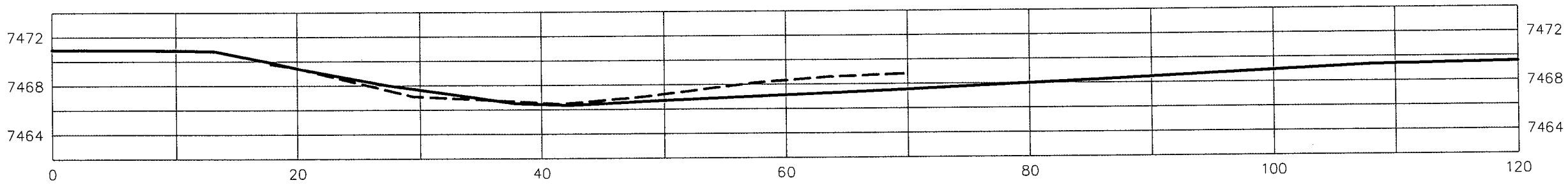
LAND & WATER CONSULTING, INC.

SCALE: 1" = 20ft
PROJECT NUMBER: 140347
LOCATION: Big Sky, Montana
DRAWN BY: RAA
CHECKED BY: P.C.
DATE: 5-29-02
FINAL APPROVAL: P.C.
FILENAME: COVER-G-PLOT-LW.dwg
SHEET: 1 of 1
FIGURE: 1
CLIENT: YMC
FIELD WORK: KIT
DRAWN BY: KW
DATE: DATE
SCALE: NOTED
PLOTTED DATE: Jun/07/2004

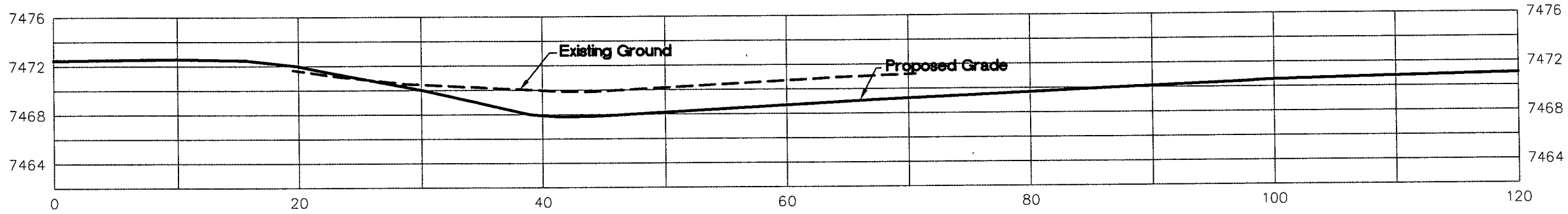
Sheet A-7: Wetland G-1 Grading Cross Sections

SCALE 1"= 10ft

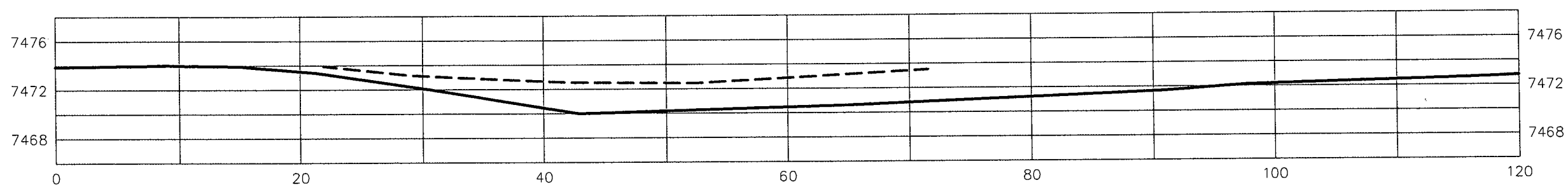
1+80



1+70



1+60



SCALE: 1" =10ft	DRAWN BY: RAA	CHECKED BY: P.C.	LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807
PROJECT NUMBER: 140347	DATE: 5-29-02	FINAL APPROVAL: P.C.	MORRISON MAIERLE, INC.
LOCATION: Big Sky, Montana	FILENAME: COVER-G-PLOT-LW.dwg	CLIENT: CLIENT	
DESCRIPTION:	SHEET: 1 of 1 FIGURE: 1	FIELD WORK: KIT	DATE: DATE
	REVISIONS# -	DRAWN BY: KW	SCALE: NOTED
		CHECKED BY:	PROJ. # PROJECT

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

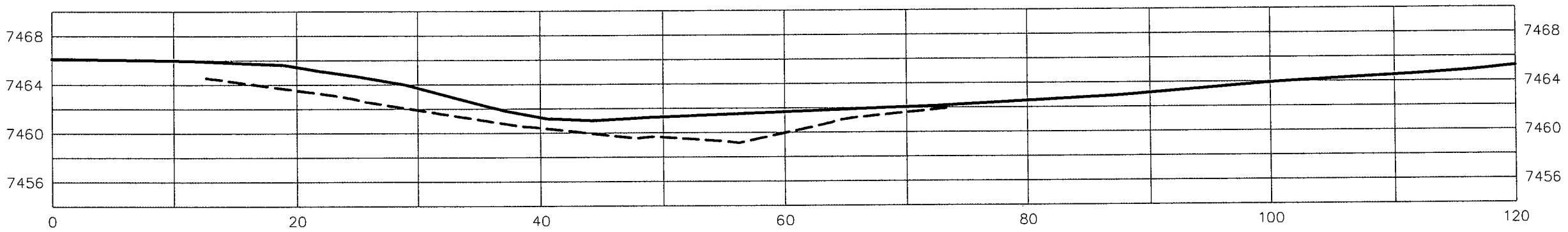
PLOTTED DATE: Jun/07/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G1-PLOT.dwg
SHEET PAGE OF 1-PAGE

A-7

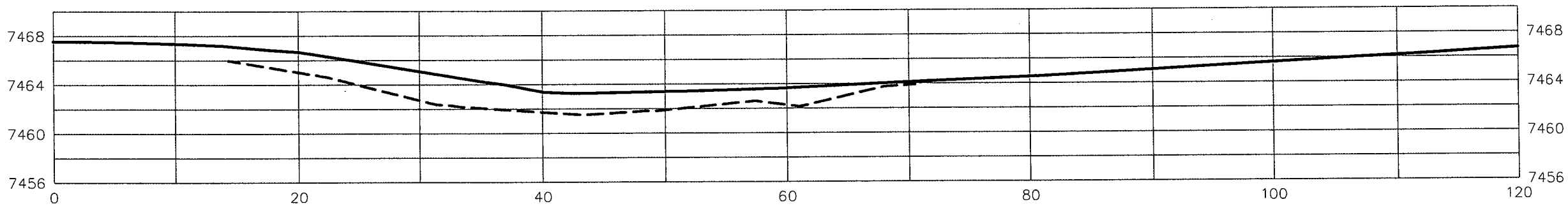
Sheet A-8: Wetland G-1 Grading Cross Sections

SCALE 1"= 10ft

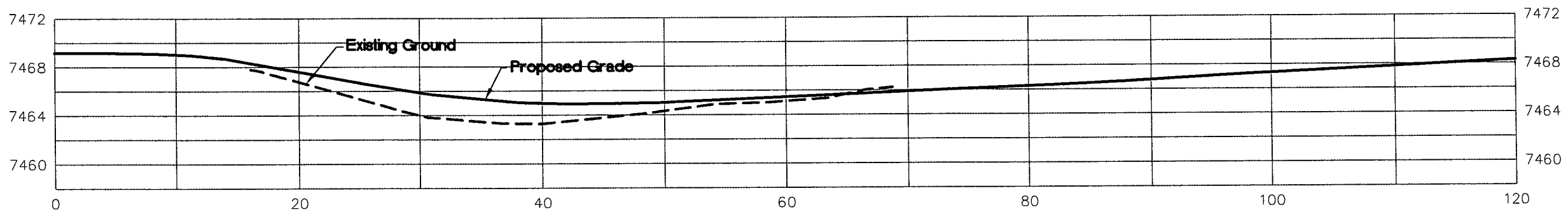
2+10



2+00



1+90



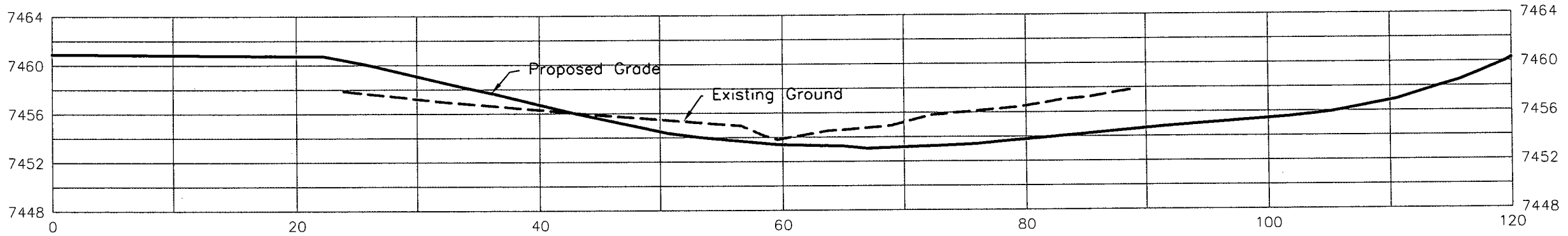
LAND & WATER CONSULTING, INC. P.O. BOX 6855 Missoula, MT 59807		MORRISON MAIERLE, INC. an Employee Owned Company	YMC GOLF COURSE WETLAND RESTORATION PROJECT
SCALE: 1" =10ft	DRAWN BY: RAA	CHECKED BY: P.C.		
PROJECT NUMBER: 140347	DATE: 5-29-02	FINAL APPROVAL: P.C.	CLIENT: YMC	
LOCATION: Big Sky, Montana	FILENAME: COVER-G-PLOT-LW.dwg			
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1	FIELD WORK: KIT	DATE: 12/19/01
	REVISION# -		DRAWN BY: JOE	SCALE: NOTED
			CHECKED BY:	PROJ. # PROJECT
				PLOTTED DATE: Jun/07/2004
				DRAWING NAME: L\140347 Golf Course\eng\grading Plan\G1-cross.dwg
				SHEET PAGE OF T-PAGE

A-8

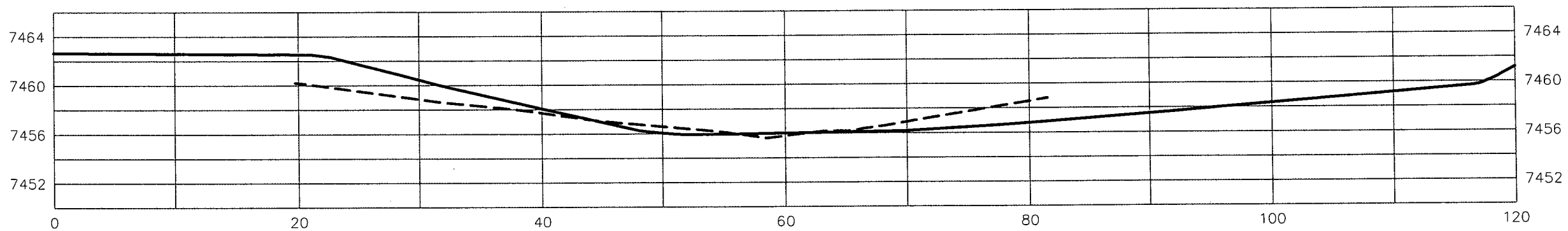
Sheet A-9: Wetland G-1 Grading Cross Sections

SCALE 1"= 10ft

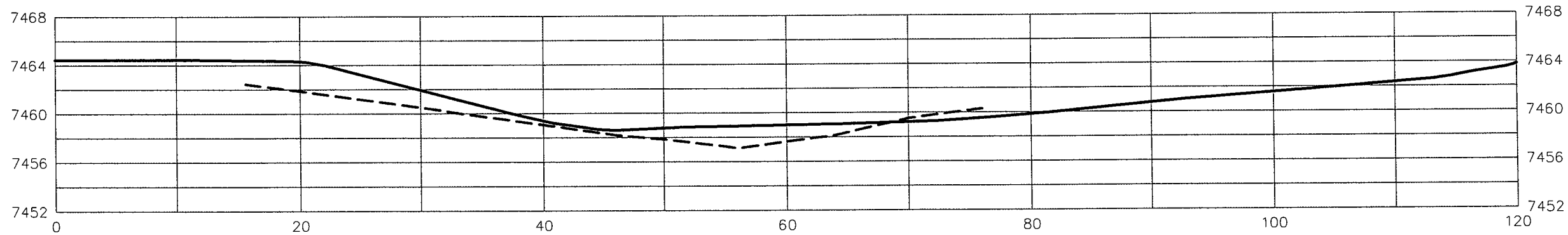
2+40



2+30



2+20

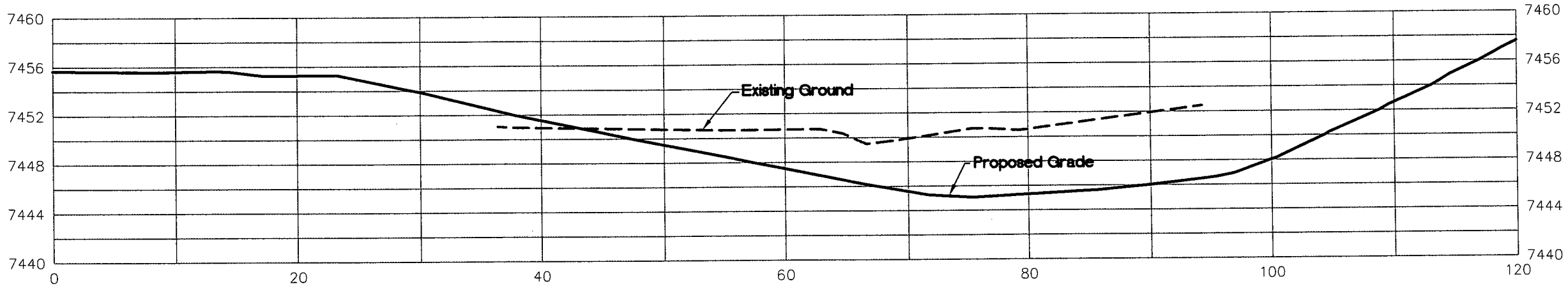


LAND & WATER CONSULTING, INC. P.O. BOX 8806 Missoula, MT 59807		MORRISON MAIERLE, Inc.	YMC GOLF COURSE WETLAND RESTORATION PROJECT
SCALE: 1" =10ft	DRAWN BY: RAA	CHECKED BY: P.C.		
PROJECT NUMBER: 140347	DATE: 5-29-02	FINAL APPROVAL: P.C.	CLIENT: YMC	
LOCATION: Big Sky, Montana	FILENAME: COVER-G-PLOT-LW.dwg		FIELD WORK: KIT	DATE: 12/19/01
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1	DRAWN BY: JOH	SCALE: NOTED
	REVISIONS: -		CHECKED BY:	PROJ. # PROJECT
			PLOTTED DATE: Jun/07/2004	
			DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G1-PLOT-grade	
			SHEET PAGE OF T-PAGE	A-9

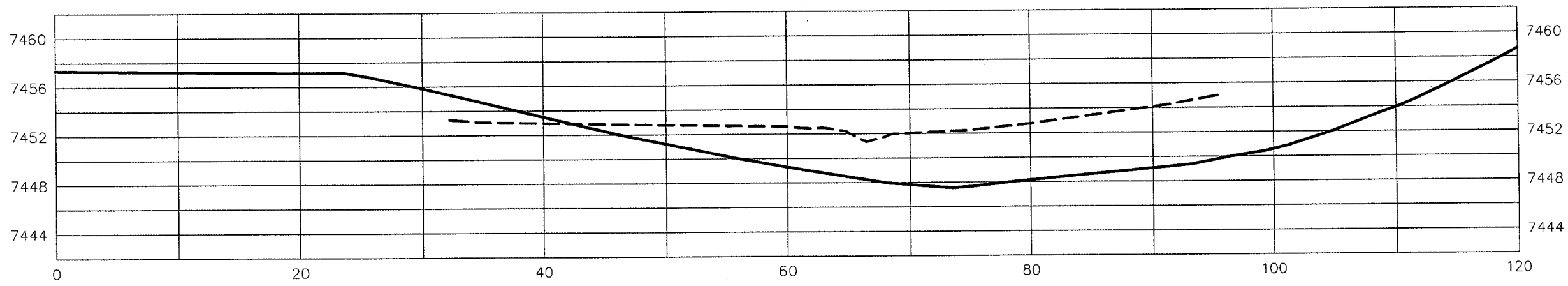
Sheet A-10: Wetland G-1 Grading Cross Sections

SCALE 1"= 10ft

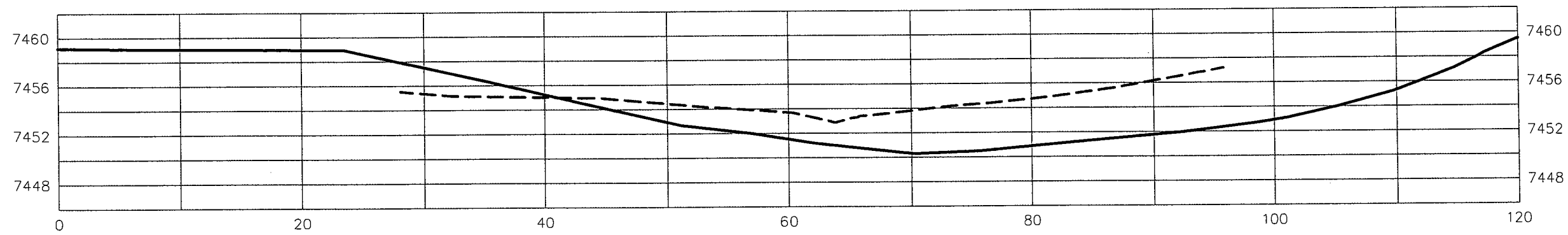
2+70



2+60



2+50



LAND & WATER CONSULTING, INC.
P.O. BOX 6864
Missoula, MT 59807

MORRISON MAIERLE, Inc.
An Employee-Owned Company

SCALE: 1" =10ft	DRAWN BY: RAA
PROJECT NUMBER: 1403H7	CHECKED BY: P.C.
LOCATION: Big Sky, Montana	DATE: 5-29-03
DESCRIPTION:	FILENAME: COVER-G-PLOT-LW.dwg
	SHEET: 1 of 1
	FIGURE: 1
	REVISIONS: -
	FINAL APPROVAL: P.C.
	CLIENT: YMC
	FIELD WORK: MT
	DRAWN BY: MW
	CHECKED BY:
	DATE: 12/19/02
	SCALE: NOTED
	PROJ. # PROJECT

YMC GOLF COURSE WETLAND RESTORATION PROJECT

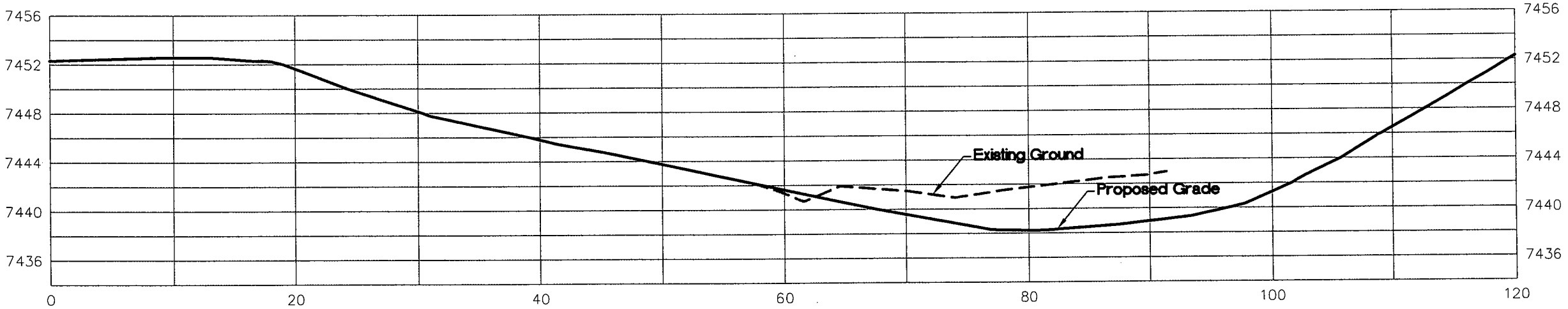
PLOTTED DATE: Jun/07/2004
DRAWING NAME: L:\1403H7 Golf Course\dwg\grading Plan\G1-PLOT
SHEET PAGE OF T-PAGE

A-10

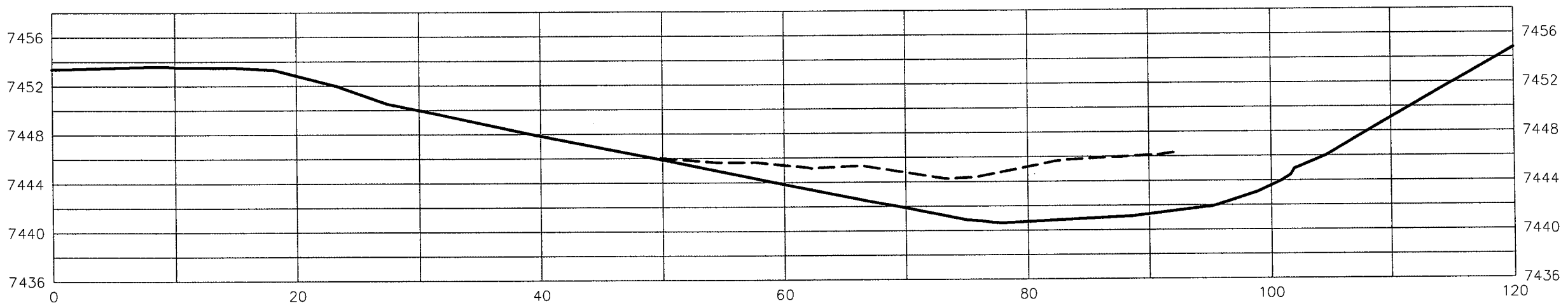
Sheet A-11: Wetland G-1 Grading Cross Sections

SCALE 1"= 10ft

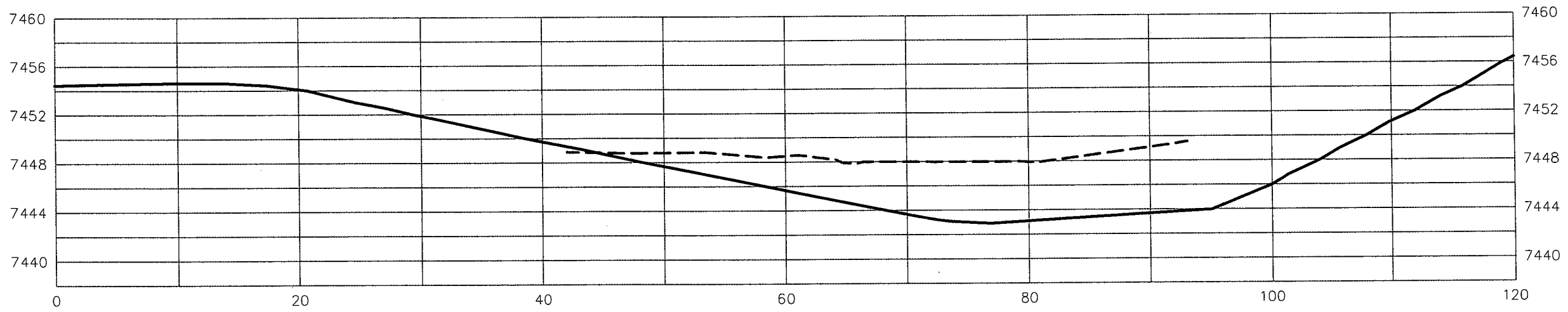
3+00



2+90



2+80



LAND & WATER CONSULTING, INC.
P.O. BOX 6864
MISSOULA, MT 59807

MORRISON MAIERLE, INC.

SCALE: 1" =10ft	DRAWN BY: RAA
PROJECT NUMBER: 140147	DATE: 5-29-02
LOCATION: Big Sky, Montana	FILENAME: COVER-G-PLOT-LW.dwg
DESCRIPTION:	SHEET: 1 of 1
	REVISION # -
CHECKED BY: P.C.	
FINAL APPROVAL: P.C.	
FIGURE: 1	

CLIENT: YMC
FIELD WORK: KIT — DATE: 12/19/01
DRAWN BY: KIM — SCALE: NOTED
CHECKED BY: — PROJ. # PROJECT

YMC
GOLF COURSE WETLAND RESTORATION PROJECT

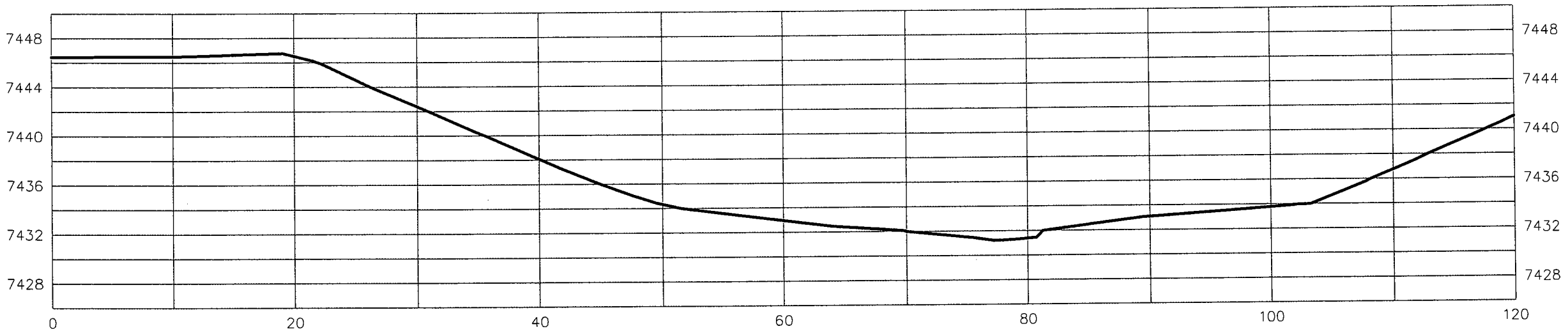
PLOTTED DATE: Jun/07/2004
DRAWING NAME: LA\140147 Golf Course\Arch\grading Plan\01-A-11.dwg
SHEET PAGE OF T=PAGE

A-11

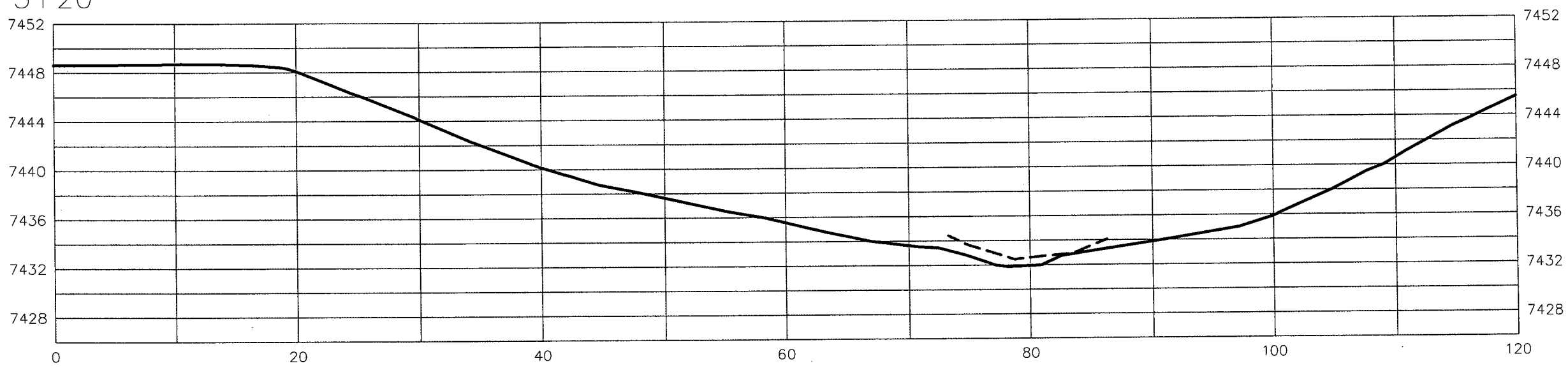
Sheet A-12: Wetland G-1 Grading Cross Sections

SCALE 1"= 10ft

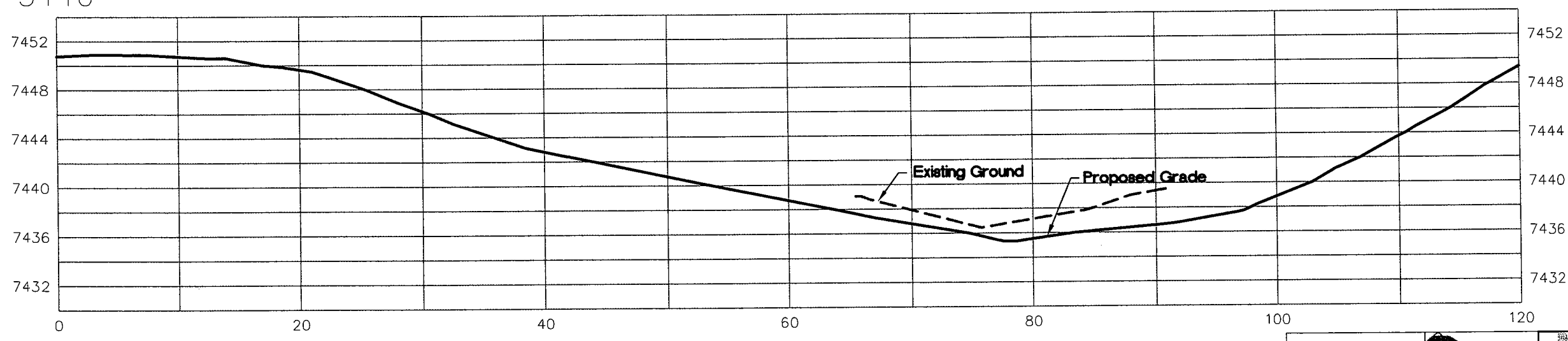
3+30



3+20



3+10



LAND & WATER CONSULTING, INC.

MORRISON MAIERLE, Inc.

YMC
GOLF COURSE WETLAND RESTORATION PROJECT

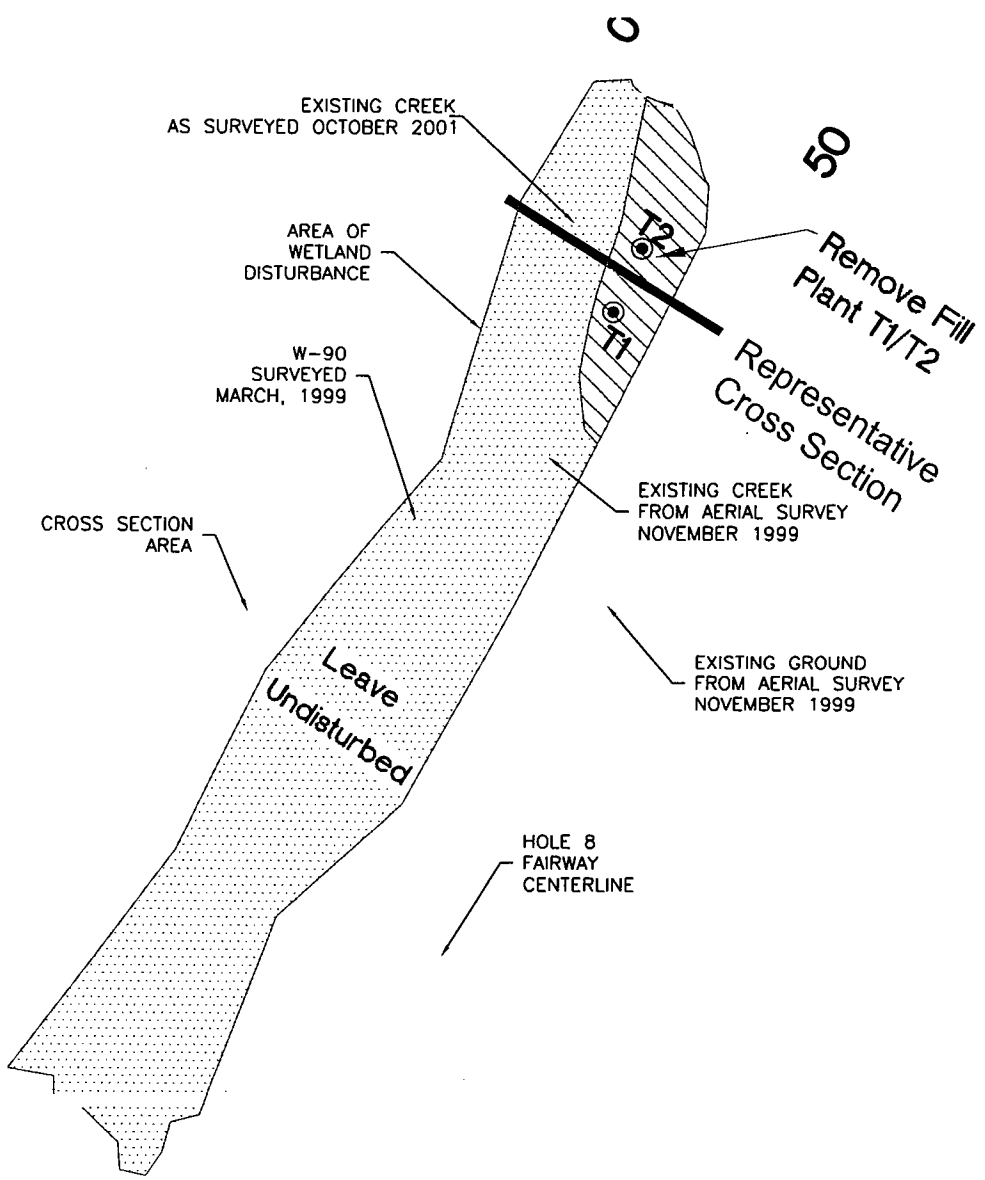
SCALE: 1" =10ft	DRAWN BY: RAA	CHECKED BY: P.C.
PROJECT NUMBER: 140347	DATE: 5-29-02	FINAL APPROVAL: P.C.
LOCATION: Big Sky, Montana	FILENAME: COVER-G-PLOT-LW.dwg	
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1
	REVISION# -	

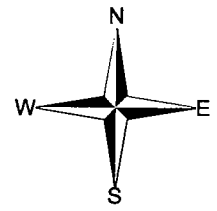
CLIENT: YMC
FIELD WORK: KIT
DRAWN BY: KW
CHECKED BY: C-BY
DATE: 12/19/01
SCALE: NOTED
PROJ. #: PROJECT

PLOTTED DATE: Jun/07/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G1-PLOT-LW.dwg
SHEET PAGE OF T-PAGE

A-12

Sheet A-13: Wetland G2 Grading Plan





SCALE 1"= 30ft

SCALE: 1" =30ft	DRAWN BY: RAA	CHECKED BY: P.C.	
PROJECT NUMBER: 140347	DATE: 5-29-02	FINAL APPROVAL: P.C.	
LOCATION: Big Sky, Montana	FILENAME: G:\PLOT-LYK.dwg		
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 2	
	REVISIONS -		

LAND & WATER CONSULTING, INC.

MORRISON MAIERLE, Inc.

CLIENT: YMC

FIELD WORK: KIT — DATE: 12-12-01
DRAWN BY: KW — SCALE: 1in=30ft
CHECKED BY: — PROJ # 3017.018

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

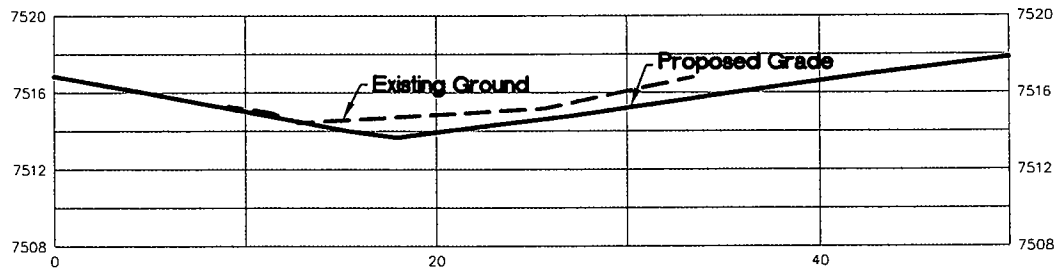
PLOTTED DATE: Jun/07/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G2-PLOT-LYK.dwg
SHEET 12 OF

Sht A-13

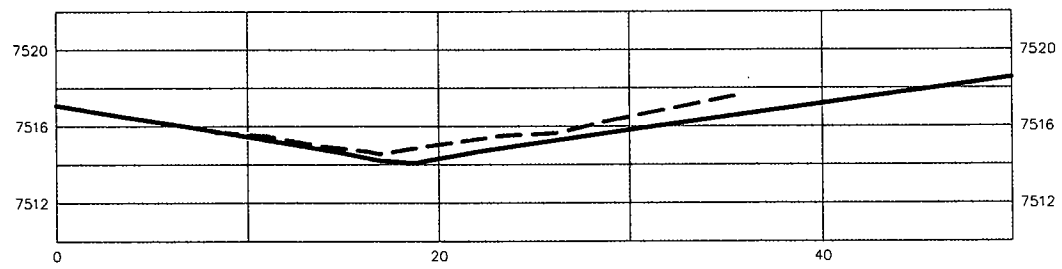
Sheet A-14: Wetland G2 Grading Cross Sections

SCALE 1"= 10ft

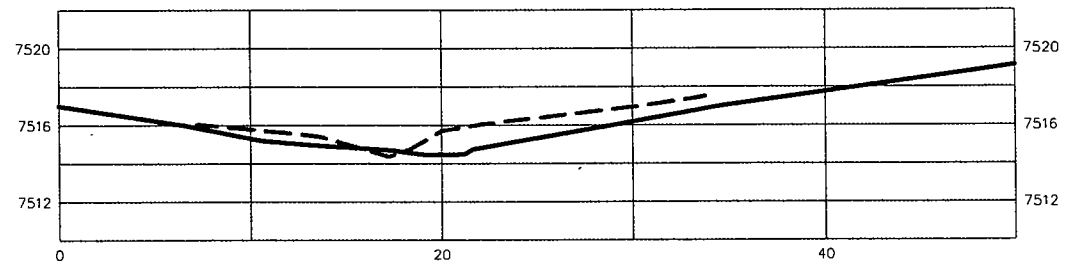
0+30



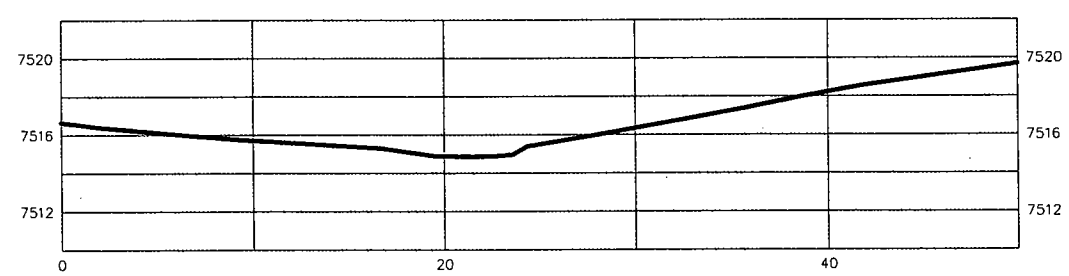
0+20



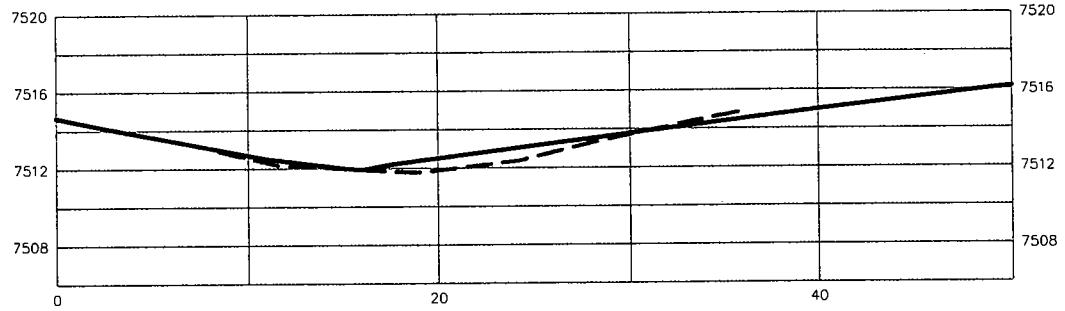
0+10



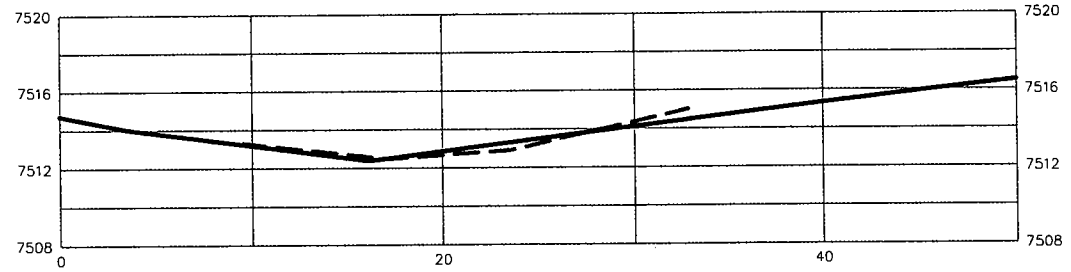
0+00



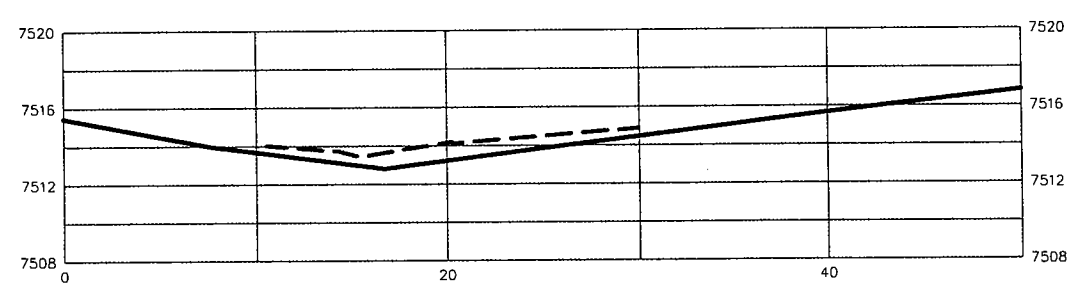
0+70



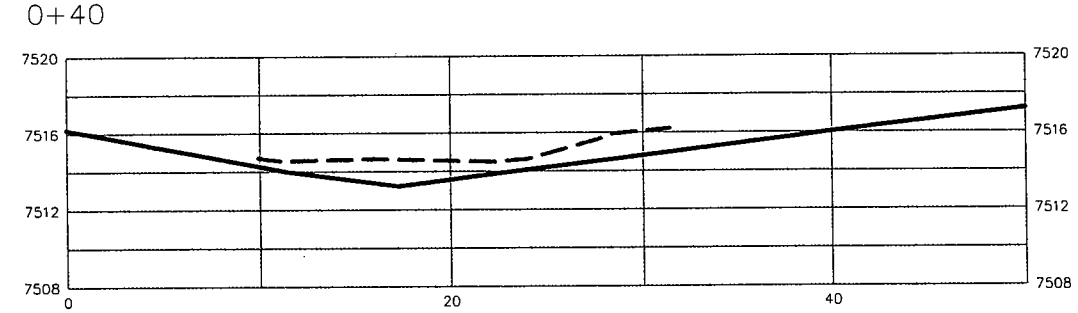
0+60



0+50



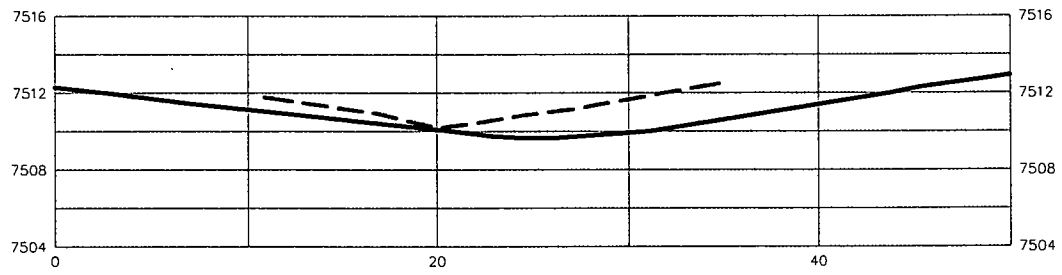
0+40

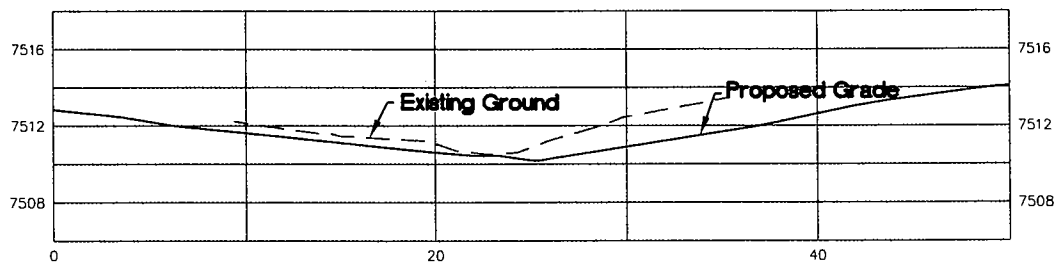


SCALE: 1" =30ft	LAND & WATER CONSULTING, INC. P.O. BOX 8854 Missoula, MT 59807		YMC GOLF COURSE WETLAND RESTORATION PROJECT
PROJECT NUMBER: 140147	DRAWN BY: RAA	CHECKED BY: P.C.	
LOCATION: Big Sky, Montana	DATE: 5-29-02	FINAL APPROVAL: P.C.	CLIENT: CLIENT
DESCRIPTION:	FILENAME: G2-PLOT-LW.dwg		MORRISON MAIERLE, INC.
	SHEET: 1 of 1	FIGURE: 2	FIELD WORK: MT DATE: 12-19-01
	REVISIONS# -		DRAWN BY: KW SCALE: NOTED
			CHECKED BY: — PROJ #: 2017.018
			PLOTTED DATE: Jun/07/2004 Sht A-14
			DRAWING NAME: L:\140147 Golf Course\dwg\grading Plan\G2-PLOT-LW.dwg
			SHEET 12 OF

Sheet A-15: Wetland G2 Grading Cross Sections

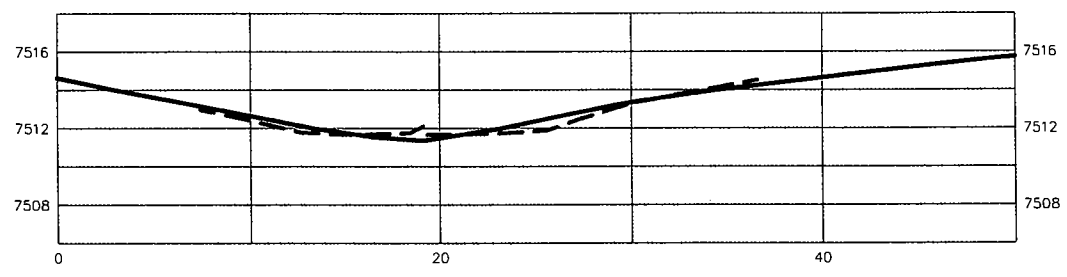
SCALE 1"= 10ft



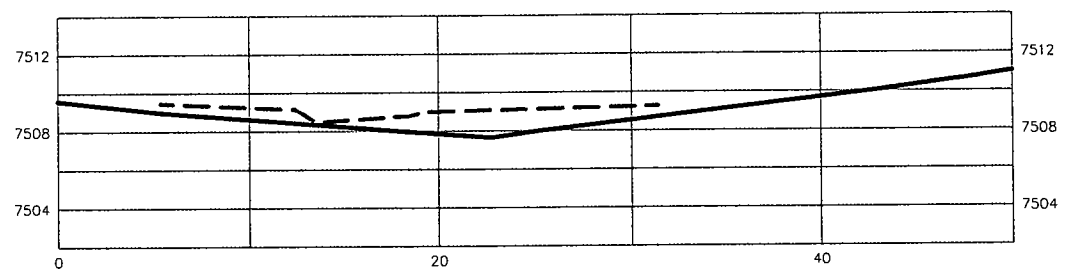


0+90

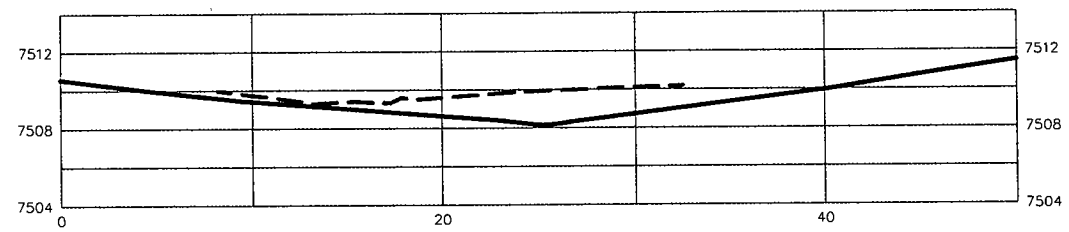
0+80



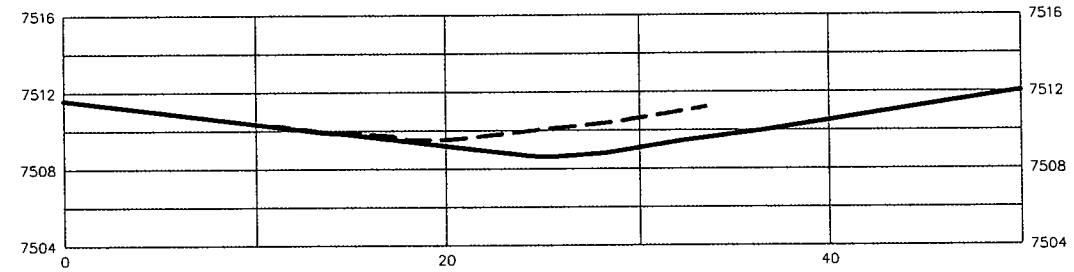
1+50



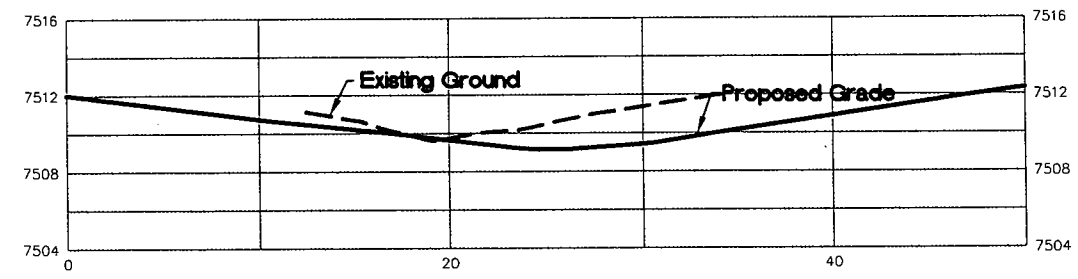
1+40



1+30



1+20



LAND & WATER CONSULTING, INC.		MORRISON MAIERLE, Inc.
SCALE: 1" =30ft	DRAWN BY: RAA	CHECKED BY: P.C.
PROJECT NUMBER: 140147	DATE: 5-29-02	FINAL APPROVAL: P.C.
LOCATION: Big Sky, Montana	FILENAME: G2-PLOT-LW.dwg	CLIENT: CLIENT
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 2
	REVISION# -	FIELD WORK: KIT
		DRAWN BY: KW
		CHECKED BY: -
		DATE: 12-19-01
		SCALE: NOTED
		PROJ #: 3017.018

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

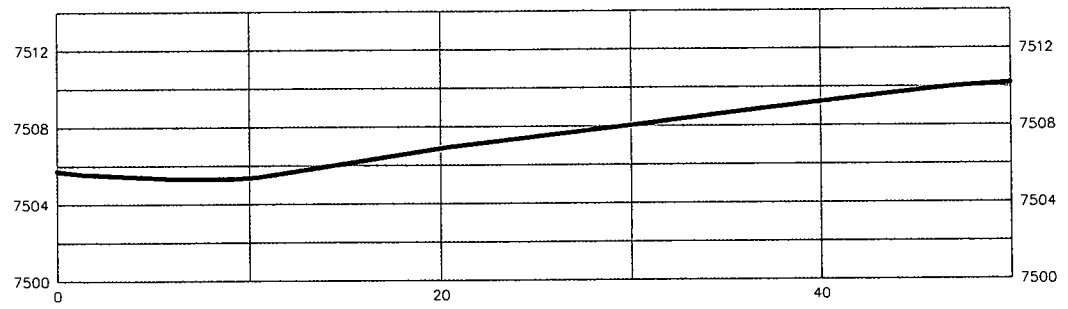
PLOTTED DATE: Jun/07/2004
DRAWING NAME: L:\140147 Golf Course\dwg\grading sheets\G2-PLOT-LW.dwg
SHEET F2 OF

ShLA-15

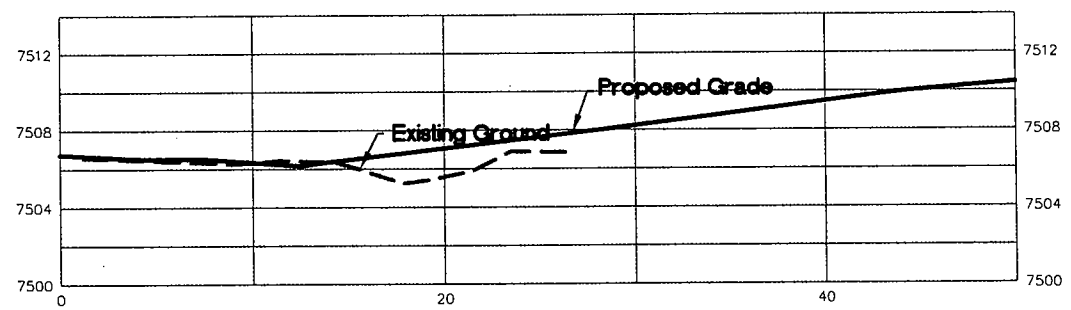
Sheet A-16: Wetland G2 Grading Cross Sections

SCALE 1"= 10ft

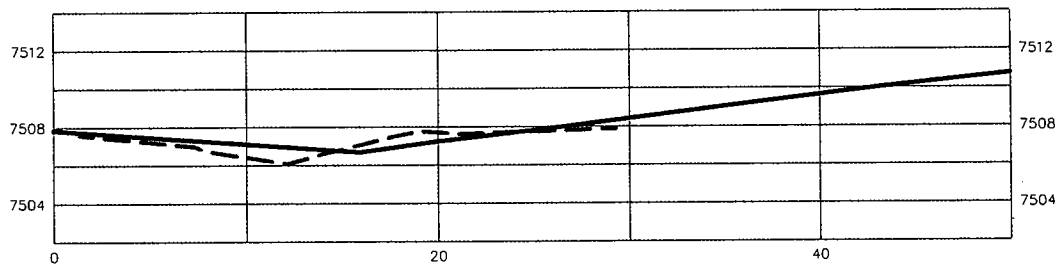
1+90



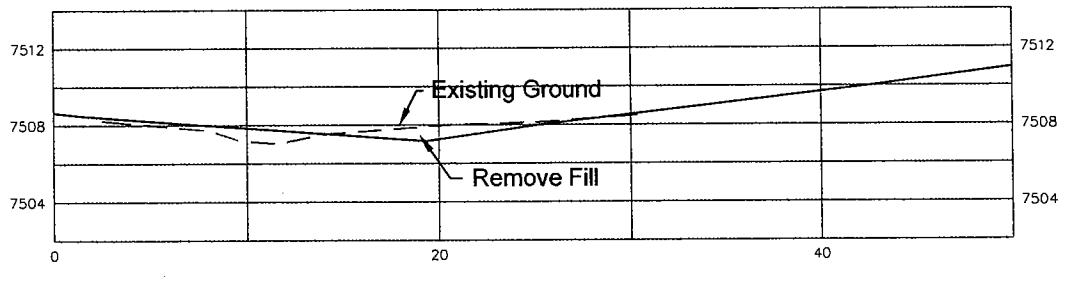
1+80



1+70

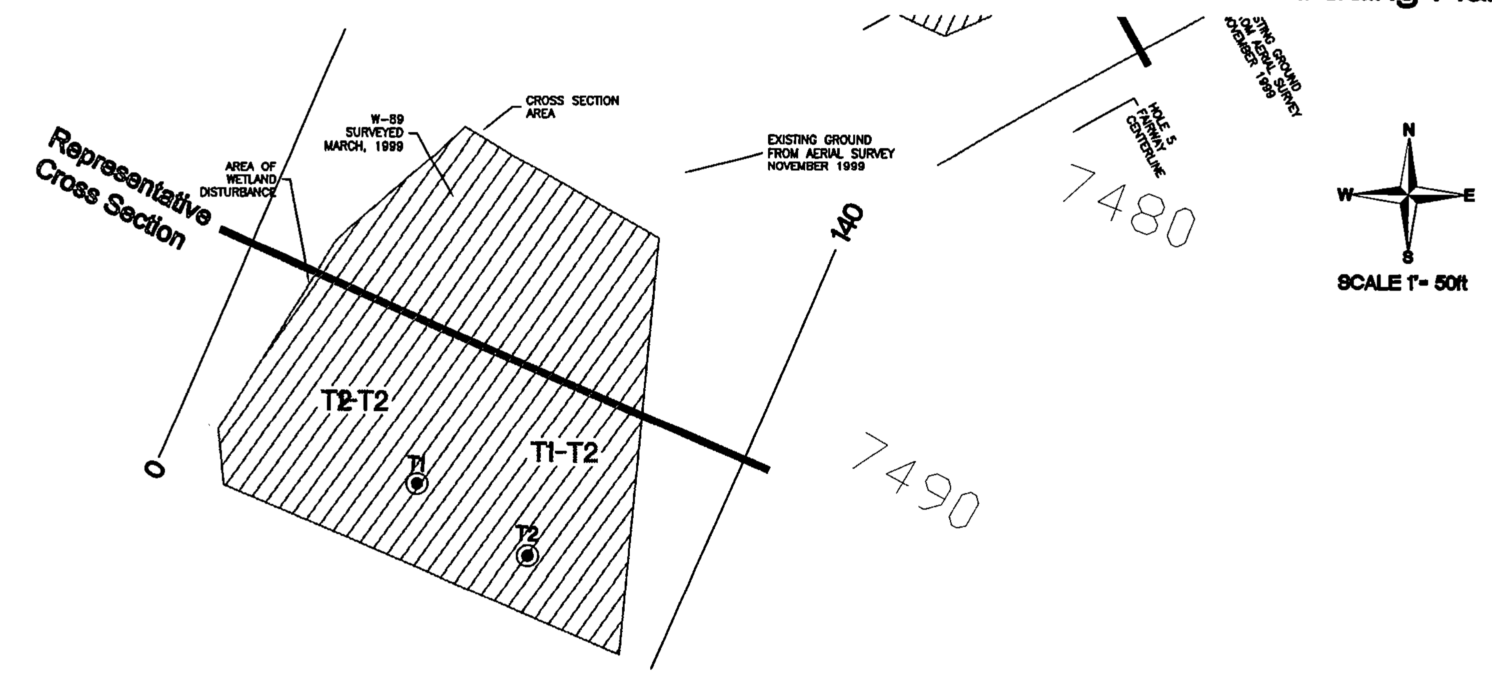


1+60



LAND & WATER CONSULTING, INC. P.O. BOX 8954 Missoula, MT 59807		MORRISON MAIERLE, Inc.	YMC GOLF COURSE WETLAND RESTORATION PROJECT
SCALE: 1" =30ft	DRAWN BY: RAA	CHECKED BY: P.C.	CLIENT: CLIENT	
PROJECT NUMBER: 14047	DATE: 5-29-02	FINAL APPROVAL: P.C.		
LOCATION: Big Sky, Montana	FILENAME: G1-PLOT-LW.dwg		FIELD WORK: KIT	DATE: 12-19-01
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 2	DRAWN BY: KW	SCALE: NOTED
	REVISION# -		CHECKED BY: -	PROJ #: 3017.018
			PLOTTED DATE: Jun/07/2004	ShtA-16
			DRAWING NAME: L:\14047 Golf Course\dwg\printing Plots\G2-PLOT-LW.dwg	
			SHEET 12 OF	

Sheet A-17: Wetland G-3SW Grading Plan



MORRISON MAIERLE, Inc.

YMC GOLF COURSE WETLAND RESTORATION PROJECT

PLOTTED DATE: Jun/08/2004

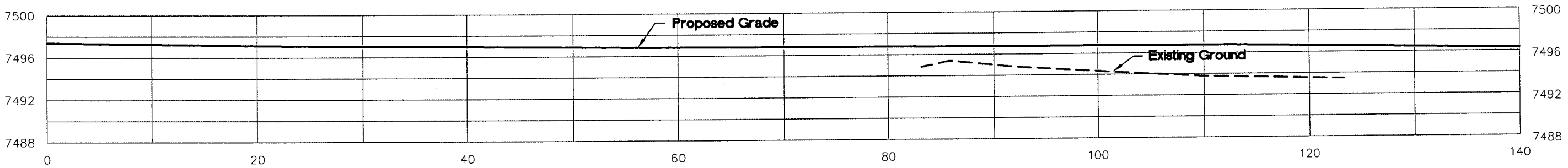
DATE: 12/18/01

A-17

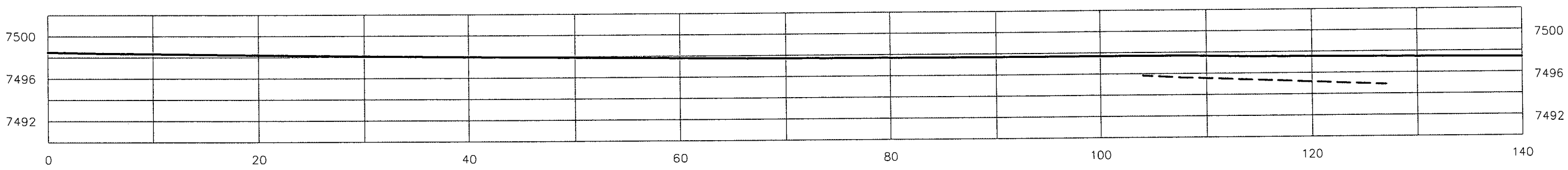
Sheet A-18: Wetland G-3SW Grading Cross Sections

SCALE 1"= 10ft

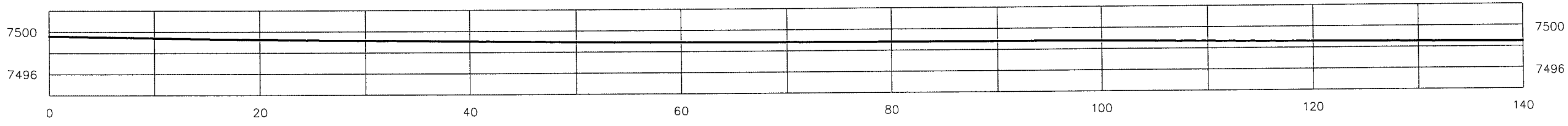
0+20



0+10



0+00

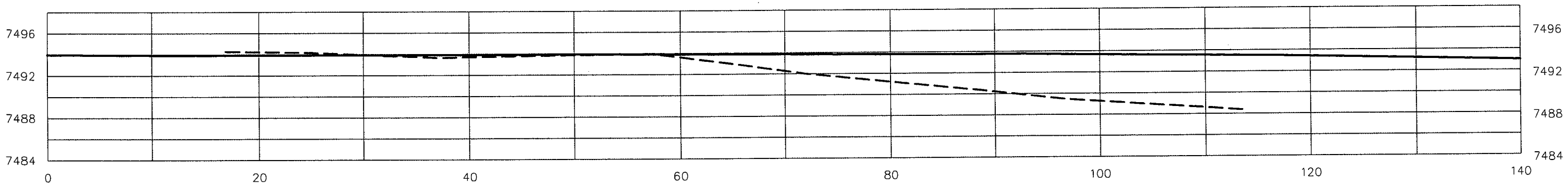


SCALE: 1" =10 ft	LAND & WATER CONSULTING, INC. P.O. BOX 5894 Bozeman, MT 59717	MORRISON MAIERLE, Inc.	YMC GOLF COURSE WETLAND RESTORATION PROJECT
PROJECT NUMBER: 140347	DRAWN BY: RAA / CHECKED BY: P.C.	CLIENT: CLIENT	
LOCATION: Big Sky, Montana	DATE: 5-29-02 / FINAL APPROVAL: P.C.	FIELD WORK: RJT	PLOTTED DATE: Jun/07/2004
DESCRIPTION:	FILENAME: 140347/COVER-G-PLOT-LW.dwg	DRAWN BY: KW	DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\Sheet A-18.dwg
	SHEET: 1 of 1 / FIGURE: 1	CHECKED BY: —	SHEET 2 OF 1=PAGE
	REVISION# -	DATE: 12/19/01	A-18
		SCALE: SCALE	
		PROJ #: PROJECT	

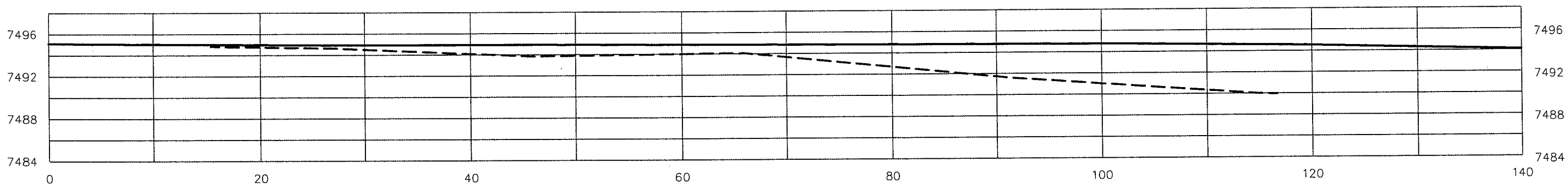
Sheet A-19: Wetland G-3SW Grading Cross Sections

SCALE 1"= 10ft

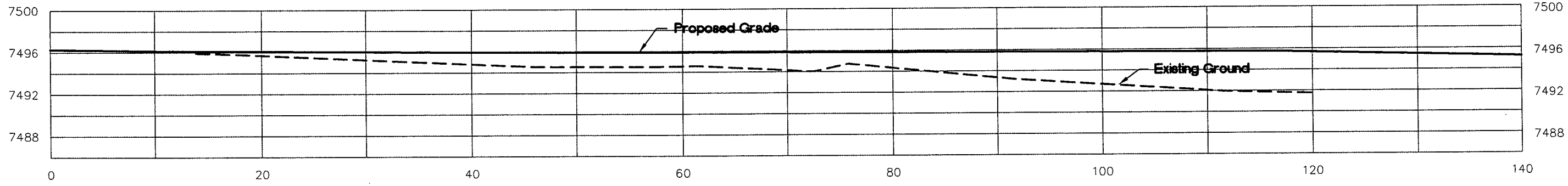
0+50



0+40



0+30

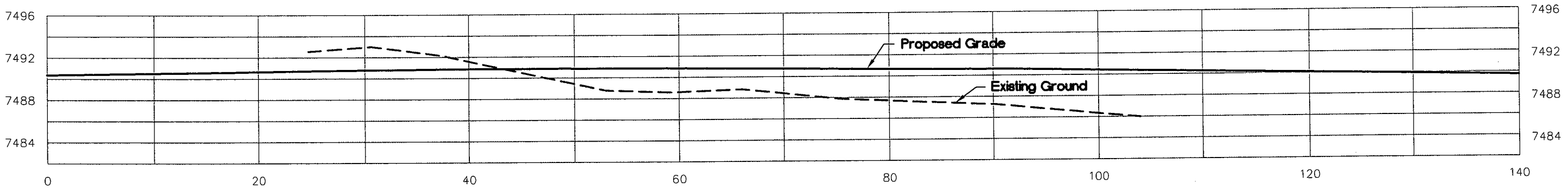


SCALE: 1" =10 ft	LAND & WATER CONSULTING, INC.	MORRISON MAIERLE, Inc.	YMC GOLF COURSE WETLAND RESTORATION PROJECT
PROJECT NUMBER: 140347	DRAWN BY: RAA / CHECKED BY: P.C.		
LOCATION: Big Sky, Montana	DATE: 5-29-02 / FINAL APPROVAL: P.C.	CLIENT: CLIENT	
DESCRIPTION:	FILENAME: 140347/COVER-G-PLOT-LW.dwg	FIELD WORK: MT	PLOTTED DATE: Jun/07/2004
	SHEET: 1 of 1 / FIGURE: 1	DRAWN BY: KW	DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G3SW.dwg
	REVISIONS# -	CHECKED BY:	SHEET F2 OF 1=PAGE
		DATE: 12/19/03	A-19
		SCALE: SCALE	
		PROJ #:PROJECT	

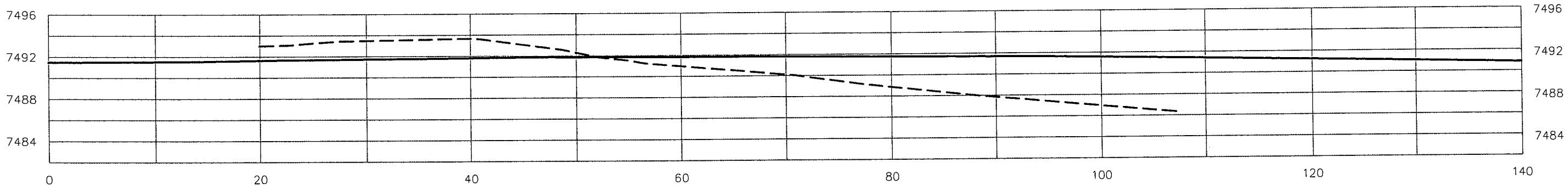
Sheet A-20: Wetland G-3SW Grading Cross Sections

SCALE 1"= 10ft

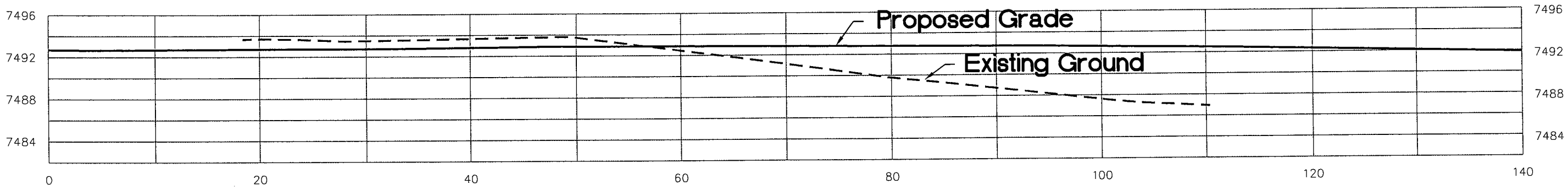
0+80



0+70



0+60



LAND & WATER CONSULTING, INC.
P.O. BOX 8818
Missoula, MT 59807

MORRISON MAIERLE, INC.

SCALE: 1" =10 ft.
PROJECT NUMBER: 140347
LOCATION: Big Sky, Montana
DESCRIPTION:
DRAWN BY: RAA
CHECKED BY: P.C.
DATE: 5-29-02
FINAL APPROVAL: P.C.
FILENAME: 140347/COVER-G-PLOT-4W.dwg
SHEET: 1 of 1
FIGURE: 1
REVISIONS# -
CLIENT: CLIENT
FIELD WORK: XX
DRAWN BY: XX
CHECKED BY: --
DATE: 12/19/01
SCALE: SCALE
PROJ. # PROJECT

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

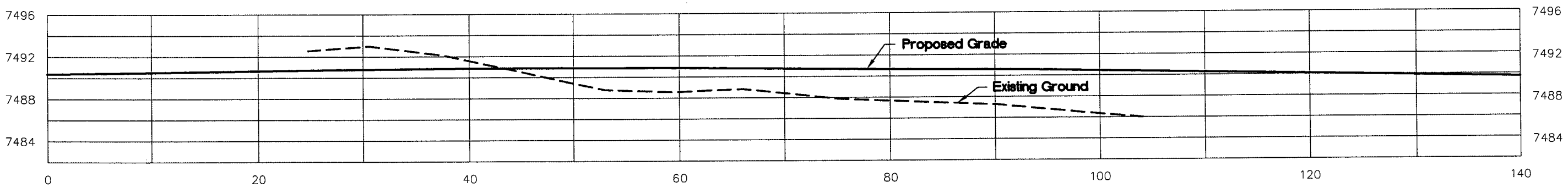
PLOTTED DATE: Jun/08/2004
DRAWING NAME:
L:\140347 Golf Course\dwg\grading Plan\A-20.dwg
SHEET 12 OF 1-PAGE

A-20

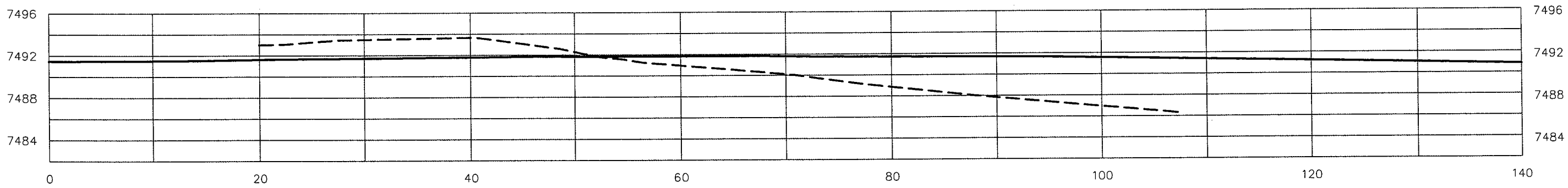
Sheet A-21: Wetland G-3SW Grading Cross Sections

SCALE 1"= 10ft

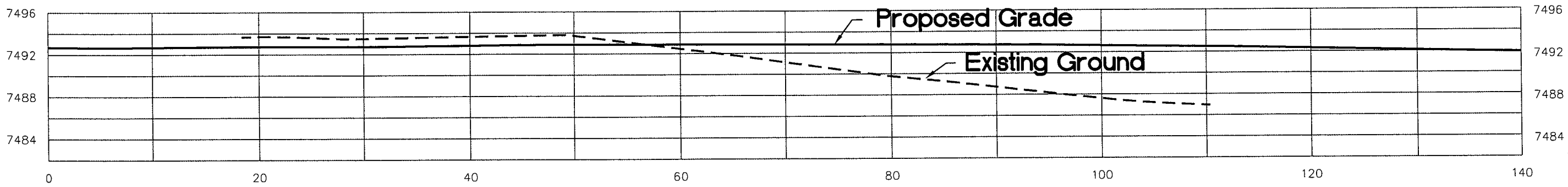
0+80



0+70



0+60



LAND & WATER CONSULTING, INC.
P.O. BOX 8818
Missoula, MT 59807

MORRISON MAIERLE, Inc.
An Employee-Owned Company

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

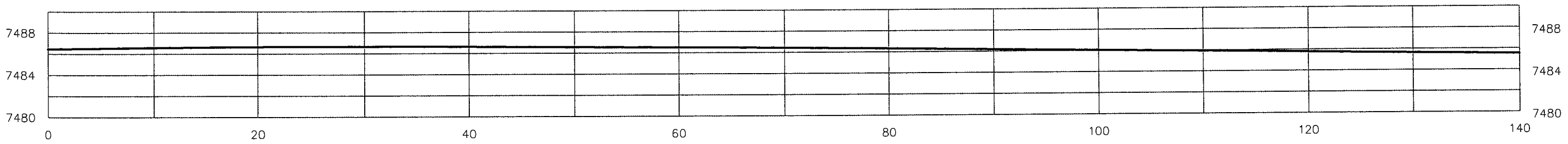
SCALE: 1" =10 ft
PROJECT NUMBER: 140147
LOCATION: Big Sky, Montana
DESCRIPTION:
DRAWN BY: RAA
CHECKED BY: P.C.
DATE: 5-29-02
FINAL APPROVAL: P.C.
FILENAME: 140147/COVER-SHEET-LVL.dwg
SHEET: 1 of 1
FIGURE: 1
REVISIONS -
CLIENT: CLIENT
FIELD WORK: KIT
DRAWN BY: KM
CHECKED BY: --
DATE: 12/19/01
SCALE: SCALE
PROJ. # PROJECT
PLOTTED DATE: Jun/08/2004
DRAWING NAME:
L:\140147 Golf Course\dwg\grading Plan\G3-PLOT-LVL.dwg
SHEET F2 OF 1-PAGE

A-21

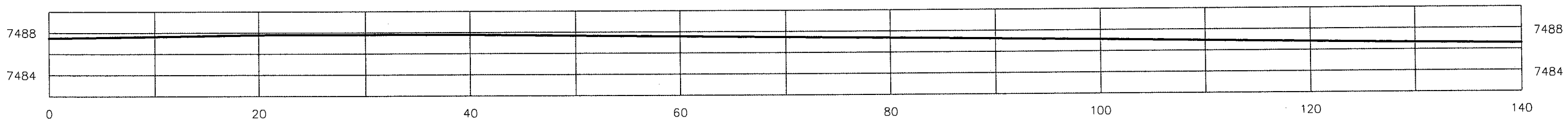
Sheet A-22: Wetland G-3SW Grading Cross Sections

SCALE 1"= 10ft

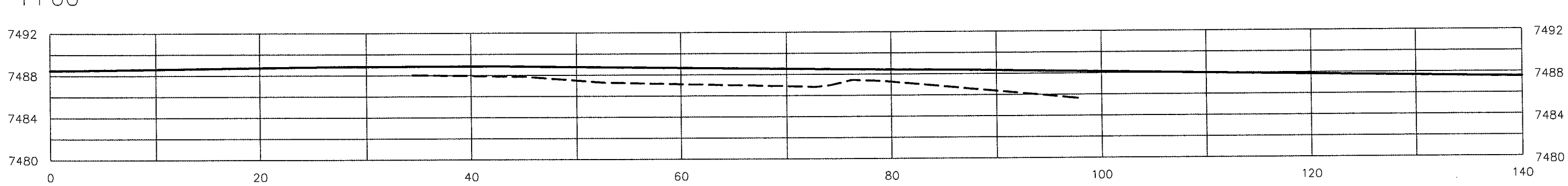
1+20



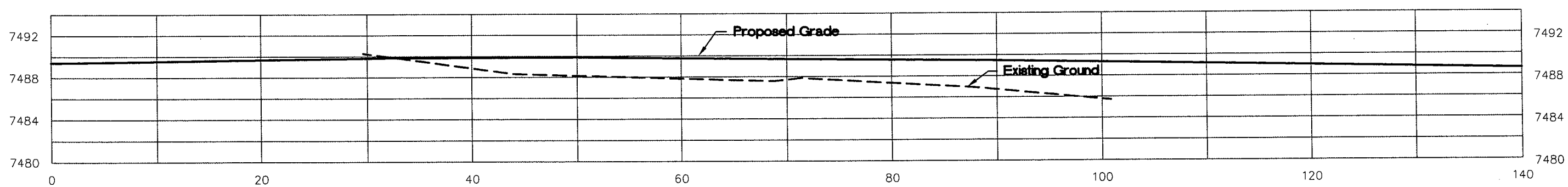
1+10



1+00



0+90



LAND & WATER CONSULTING, INC.
P.O. BOX 4824
BOZEMAN, MT 59772

MORRISON MAIERLE, INC.

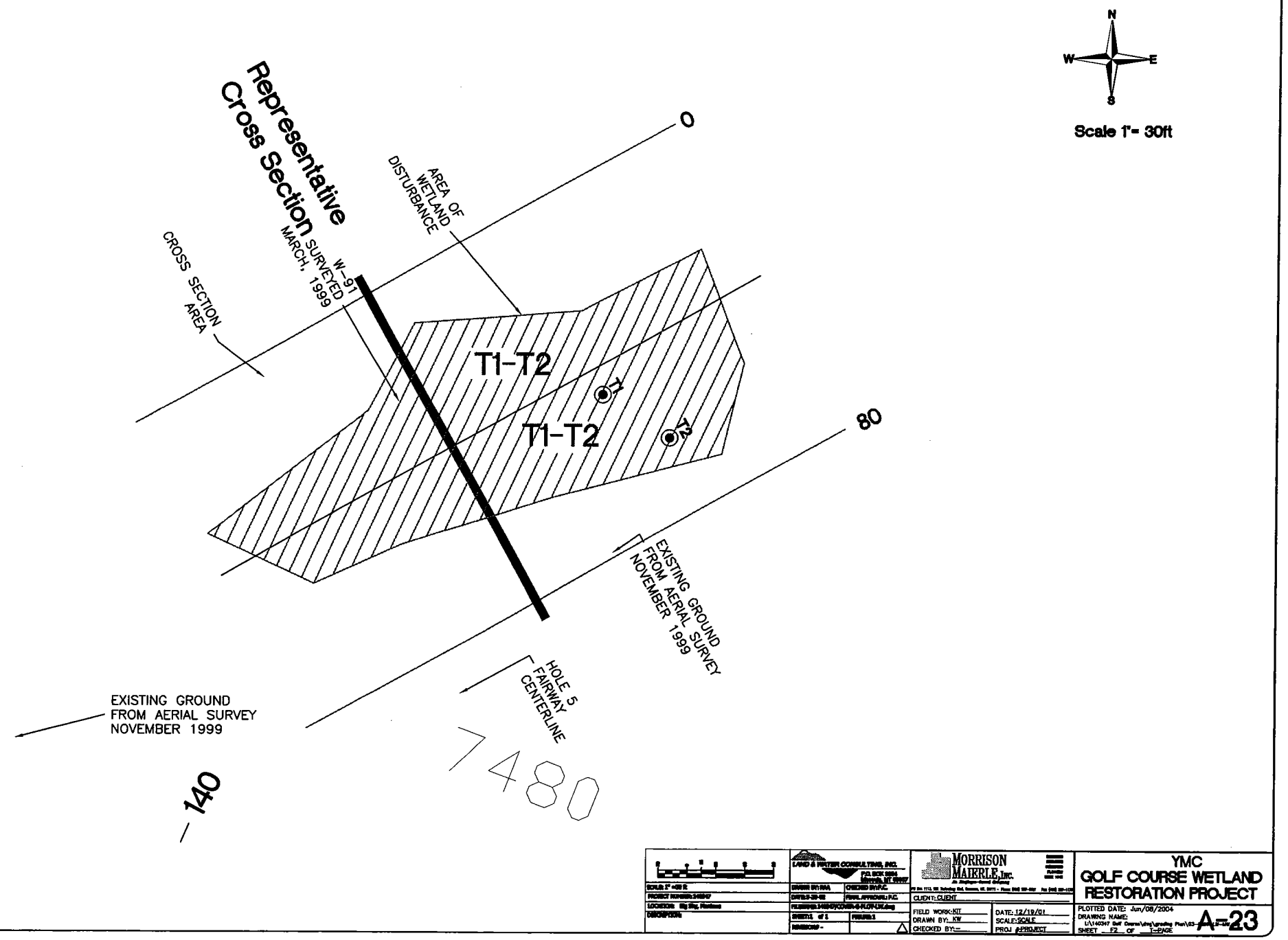
YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

SCALE: 1" =10 ft
PROJECT NUMBER: 140347
LOCATION: Big Sky, Montana
DESCRIPTION:
DRAWN BY: RAA
CHECKED BY: P.C.
DATE: 5-29-02
FINAL APPROVAL: P.C.
FILENAME: 140347/COVER-G-PLOT-LW.dwg
SHEET: 1 of 1
FIGURE: 1
REVISIONS: -
CLIENT: CLIENT
FIELD WORK: KF
DRAWN BY: KW
CHECKED BY: --
DATE: 12/18/01
SCALE: SCALE
PROJ. # PROJECT

PLOTTED DATE: Jun/08/2004
DRAWING NAME:
L:\140347 Golf Course\dwg\grading Plan\
SHEET P OF T PAGE

A-22

Sheet A-23: Wetland G-3NE Grading Plan



N
W E
S

Scale 1"= 30ft

LAND & WATER CONSULTING, INC.
P.O. BOX 5004
Lincoln, MT 59639

MORRISON MAIERLE, Inc.
An Anglian Water Company

CLIENT: CLIENT

FIELD WORK: KT
DRAWN BY: KW
CHECKED BY:

DATE: 12/19/01
SCALE: SCALE
PROJ #: PROJECT

YMC
GOLF COURSE WETLAND RESTORATION PROJECT

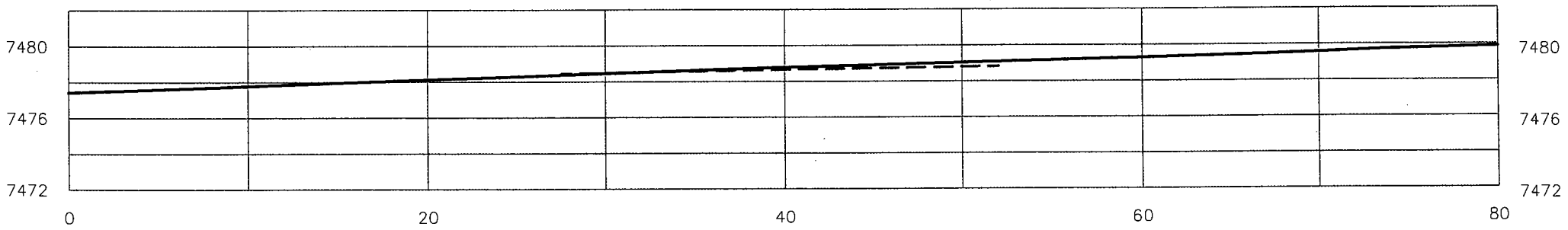
PLOTTED DATE: Jun/08/2004
DRAWING NAME: U:\HOME Golf Course\dwg\grading Plan\G3
SHEET F2 OF 1-PAGE

A-23

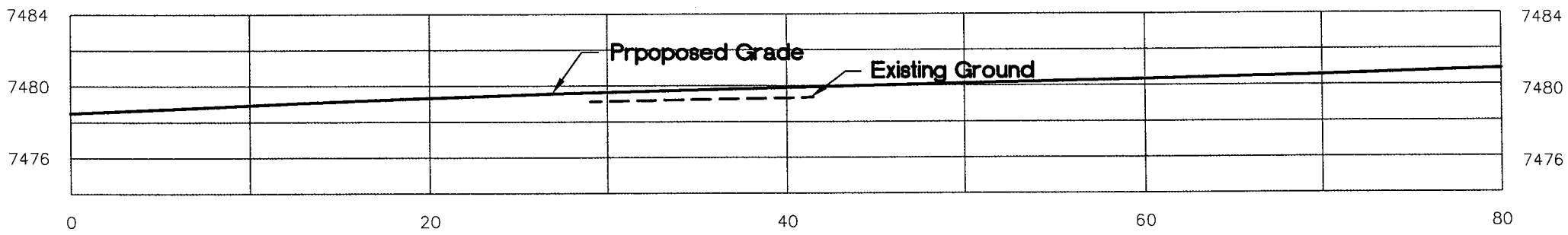
Sheet A-24: Wetland G-3NE Grading Cross Sections

SCALE 1"= 10ft

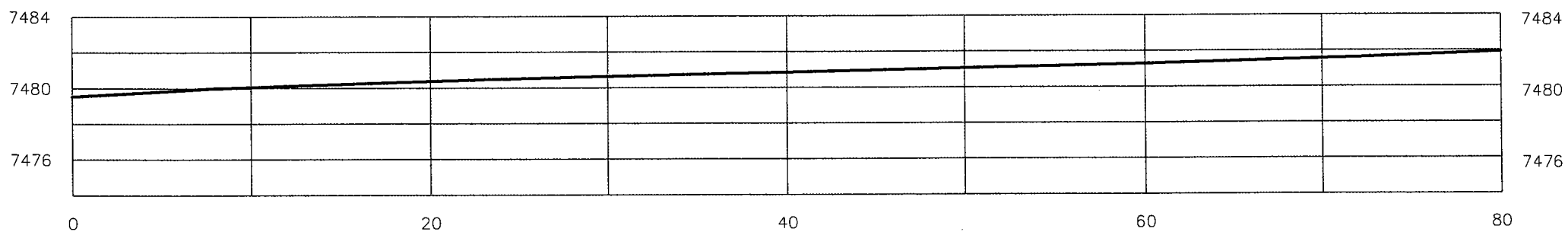
0+20



0+10



0+00



LAND & WATER CONSULTING, INC. P.O. BOX 6924 Bozeman, MT 59807			
SCALE: 1" =10 ft	DRAWN BY: RAA	CHECKED BY: P.C.	
PROJECT NUMBER: 140347	DATE: 5-29-02	FINAL APPROVAL: P.C.	
LOCATION: Big Sky, Montana	FILENAME: 140347/COVER-G-PLOT-LW.dwg		
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1	
	REVISIONS: -		

MORRISON MAIERLE, INC.
An Employee Owned Company

CLIENT: CLIENT
FIELD WORK: KIT
DRAWN BY: KW
CHECKED BY: --
DATE: 12/19/01
SCALE: SCALE
FINAL APPROVAL

YMC
GOLF COURSE WETLAND RESTORATION PROJECT

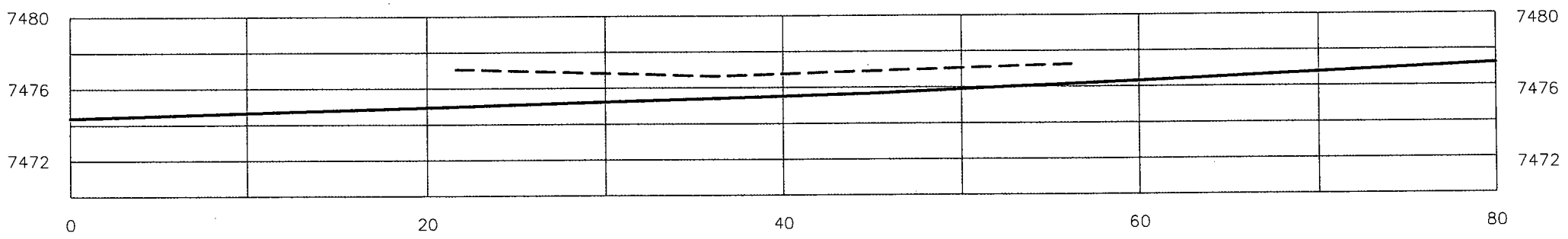
PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G-3NE-LW.dwg
SHEET 12 OF 1-2466

A-24

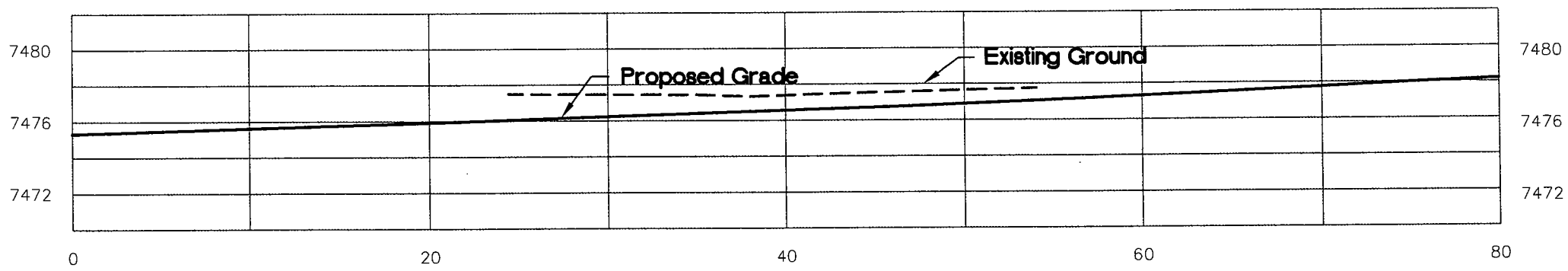
Sheet A-25: Wetland G-3NE Grading Cross Sections

SCALE 1"= 10ft

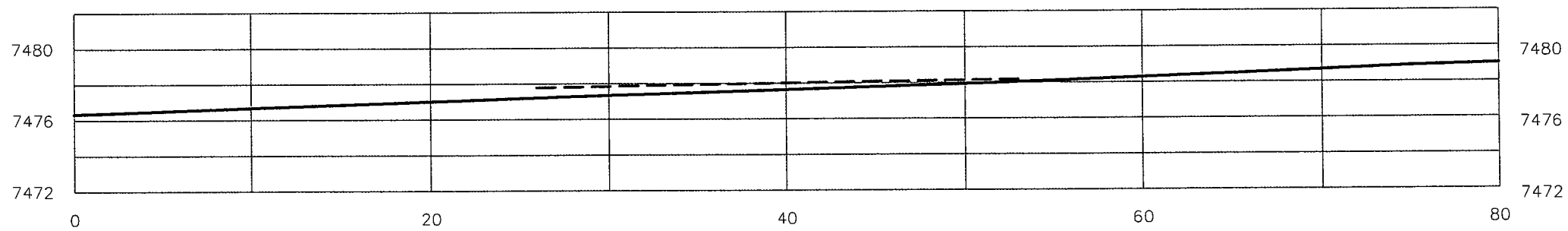
0+50



0+40



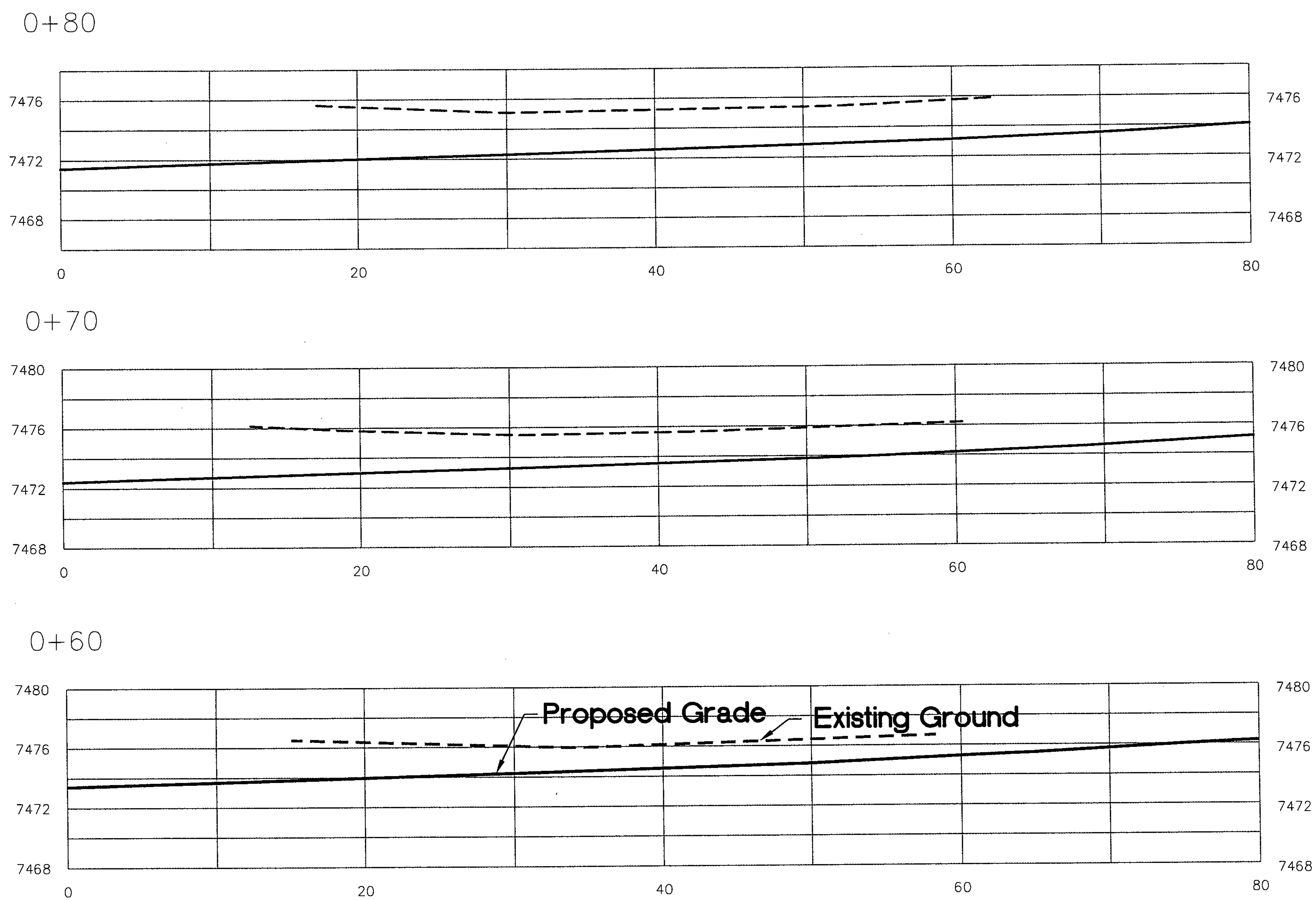
0+30



SCALE: 1" =10 ft.	DRAWN BY: RAA	CHECKED BY: P.C.	LAND & WATER CONSULTING, INC.
PROJECT NUMBER: 140147	DATE: 5-29-02	FINAL APPROVAL: P.C.	MORRISON MAIERLE, Inc.
LOCATION: Big Sky, Montana	FILENAME: 140147/COVER-G-PLOT-LW.dwg	CLIENT: CLIENT	YMC GOLF COURSE WETLAND RESTORATION PROJECT
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1	FIELD WORK: KIT — DATE: 12/19/01
	REVISIONS -	CHECKED BY: -	DRAWN BY: KW — SCALE: SCALE
			PLOTTED DATE: Jun/08/2004 — PROJ. # PROJECT
			DRAWING NAME: L:\140147 Golf Course\dwg\spreading Plan\G-PLOT-LW.dwg
			SHEET 12 OF 1-PAGE — A-25

Sheet A-26: Wetland G-3NE Grading Cross Sections

SCALE 1"= 10ft

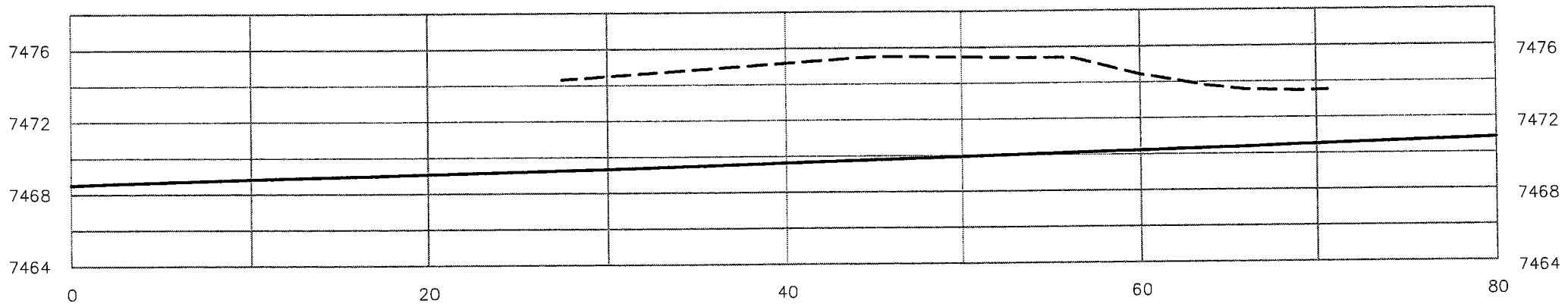


YMC
GOLF COURSE WETLAND
RESTORATION PROJECT
A-26

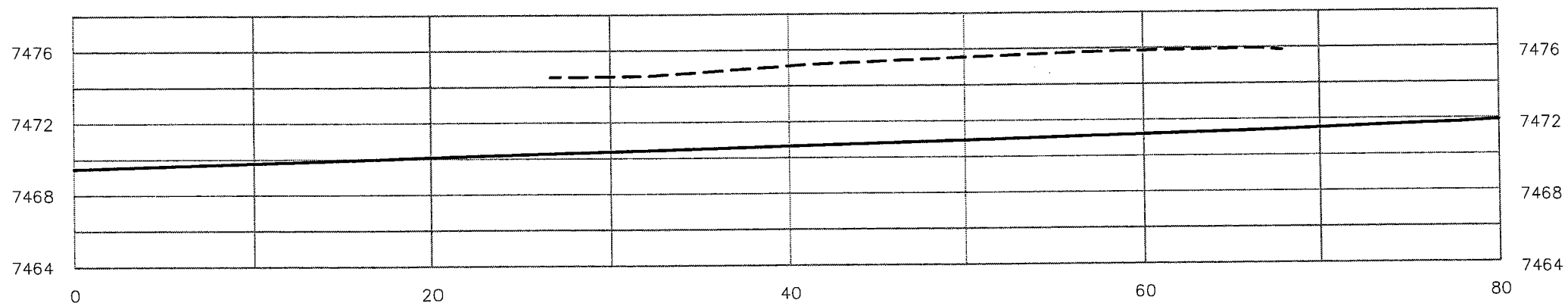
Sheet A-27: Wetland G-3NE Grading Cross Sections

SCALE 1"= 10ft

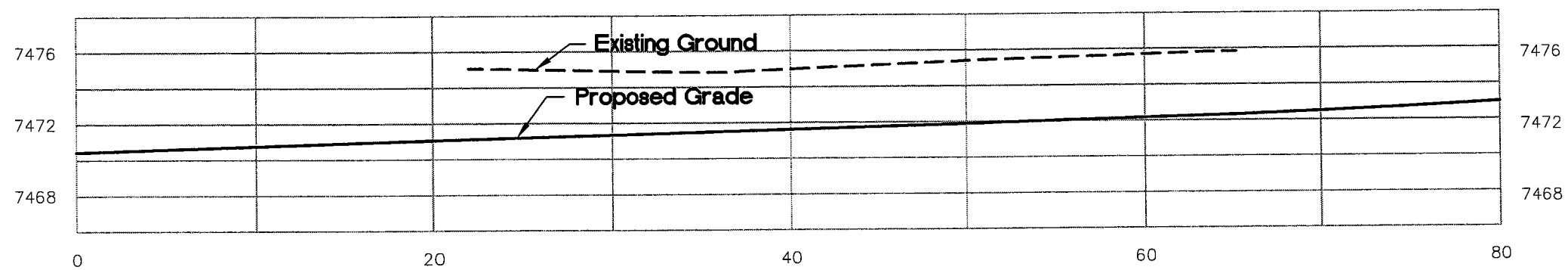
1+10



1+00



0+90

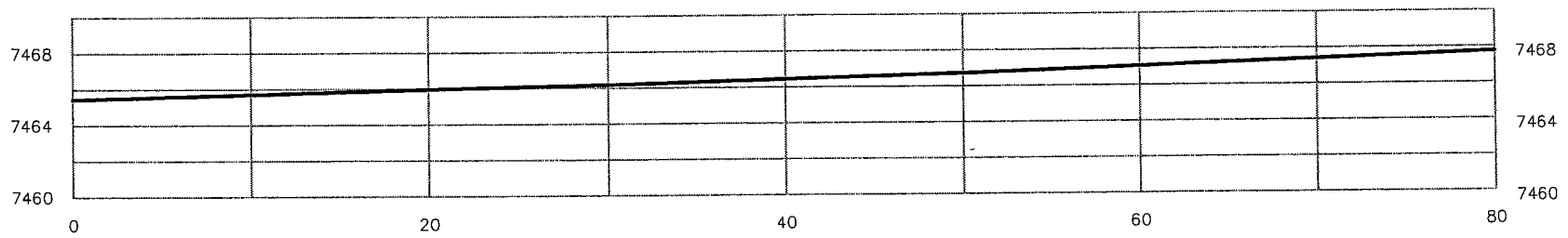


SCALE: 1" = 10 ft	LAND & WATER CONSULTING, INC.	MORRISON MAIERLE, INC.	YMC GOLF COURSE WETLAND RESTORATION PROJECT
PROJECT NUMBER: 140347	DRAWN BY: RAA / CHECKED BY: P.C.	CLIENT: CLIENT	
LOCATION: Big Sky, Montana	DATE: 5-29-02 / FINAL APPROVAL: P.C.		PLOTTED DATE: Jun/08/2004
DESCRIPTION:	FILENAME: 140347/CDWRS-G-PLOT-LW.dwg	FIELD WORK: KIT	DRAWING NAME: L\140347 Golf Course\dwg\grading Plan\A-27
	SHEET: 1 of 1 / FIGURE: 1	DRAWN BY: JDW	SHEET 12 OF 1-PAGE
	REVISION# -	CHECKED BY: —	
		DATE: 12/19/01	
		SCALE: SCALE	
		PROJ #: PROJECT	

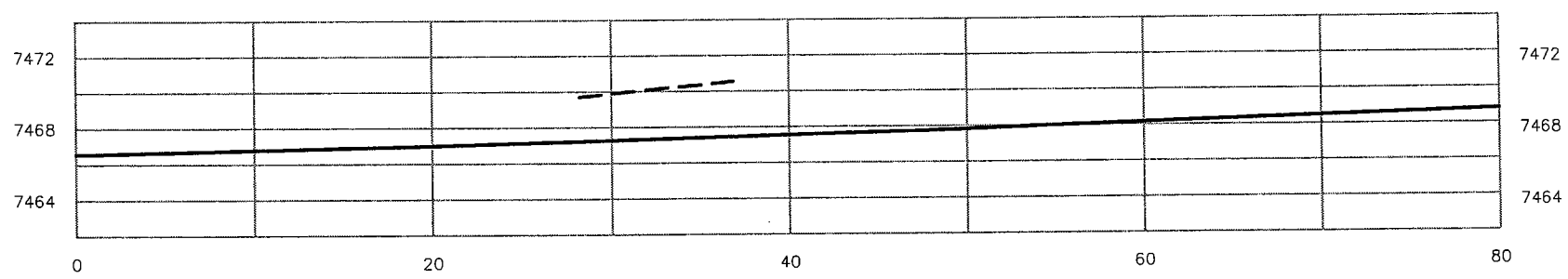
Sheet A-28: Wetland G-3NE Grading Cross Sections

SCALE 1"= 10ft

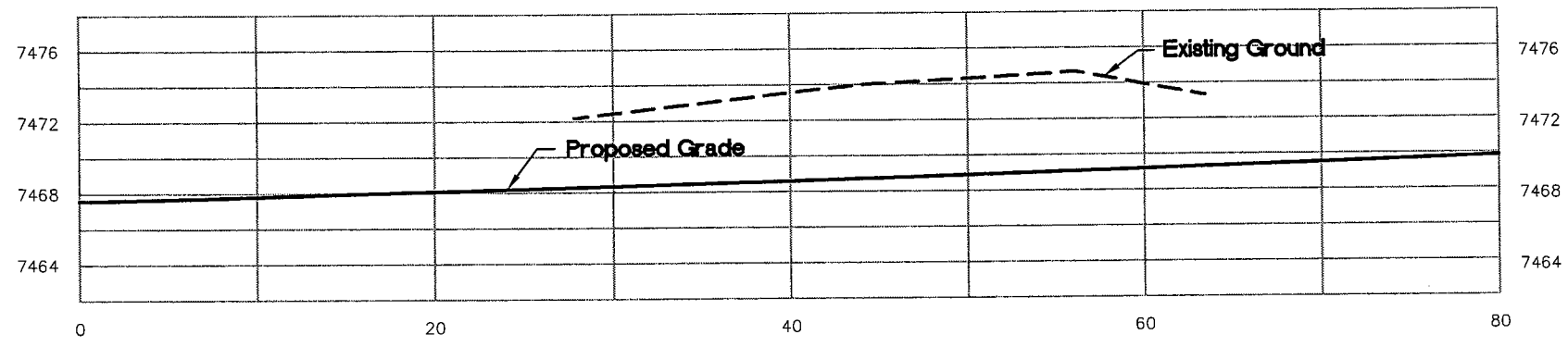
1+40



1+30



1+20



SCALE: 1" =10 ft	DRAWN BY: KAA	CHECKED BY: P.C.	LAND & WATER CONSULTING, INC.
PROJECT NUMBER: 140347	DATE: 5-29-02	FINAL APPROVAL: P.C.	CLIENT: CLIENT
LOCATION: Big Sky, Montana	FILENAME: 140347/COVER-SHEET-VM.dwg		FIELD WORK: MT
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1	DRAWN BY: KW
	REVISIONS: -		CHECKED BY: --

MORRISON MAIRLE, INC.

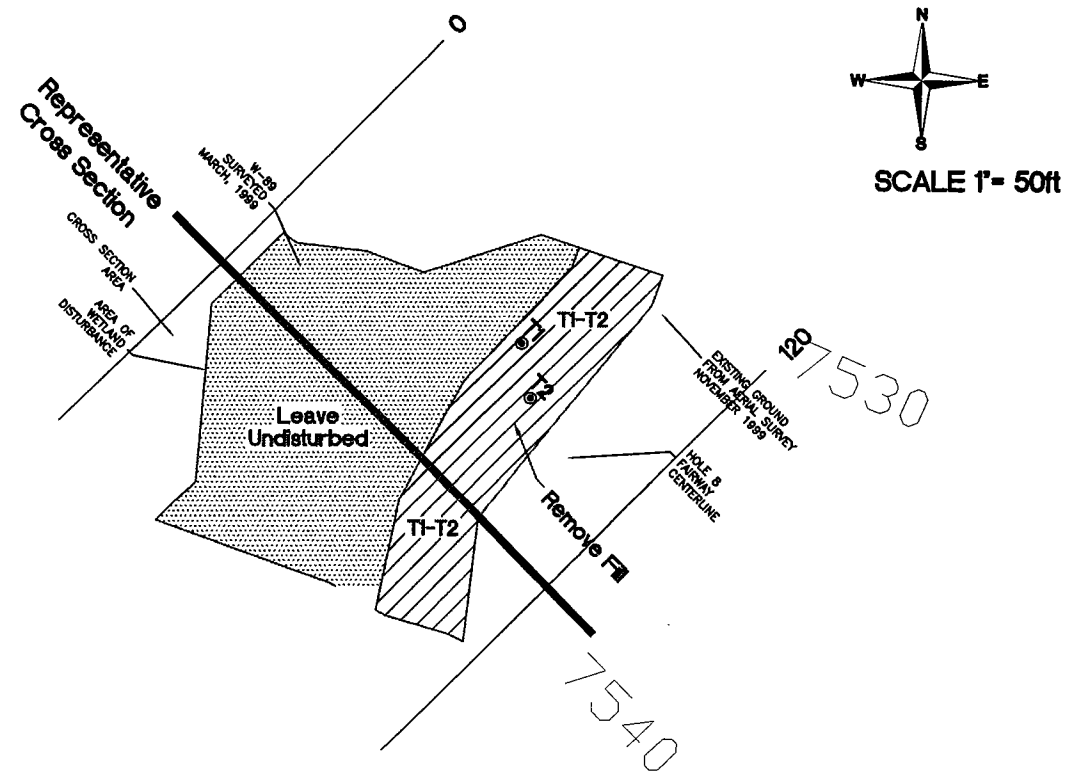
DATE: 12/19/01
SCALE: SCALE
PROJ #: PROJECT

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

PLOTTED DATE: Jun/08/2004
DRAWING NAME:
\\140347 Golf Course\dwg\grading Plan\A-28.dwg
SHEET 12 OF 1-PAGE

A-28

Sheet A-29: Wetland G-4 Grading Plan



SCALE 1"= 50ft

LAND & WATER CONSULTING, INC.
P.O. BOX 3894
Missoula, MT 59807

MORRISON MAIERLE, INC.
An Employee-Owned Company

CLIENT: YMC

FIELD WORK: MST
DRAWN BY: KW
CHECKED BY:

DATE: 12/19/01
SCALE: NOTED
PROJ #:

YMC
GOLF COURSE WETLAND RESTORATION PROJECT

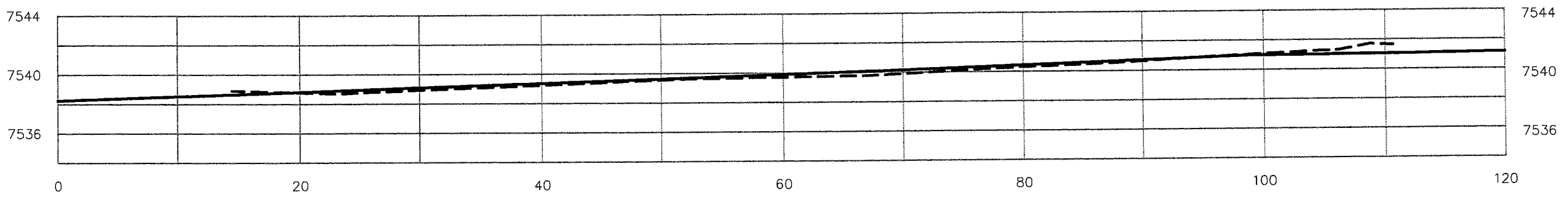
PLOTTED DATE: Jun/08/2004
DRAWING NAME: U:\14347 Golf Course\dwg\grading Plan\G4-PLOT.dwg
SHEET PAGE OF T-PAGE

A-29

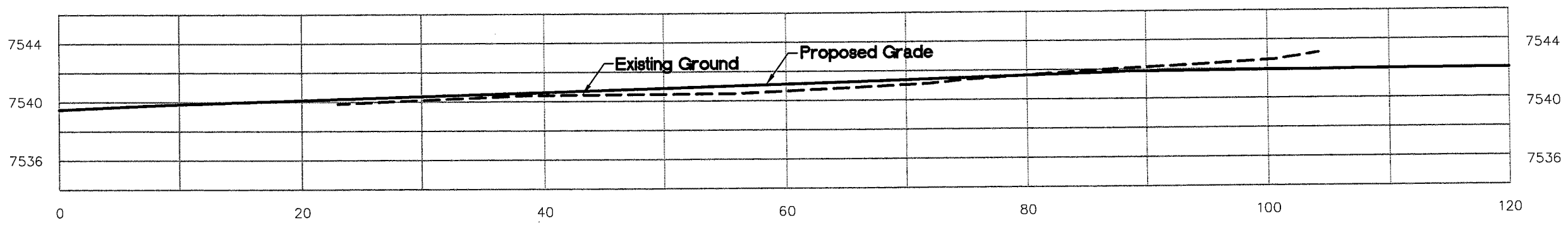
Sheet A-30: Wetland G-4 Grading Cross Sections

SCALE 1"= 10ft

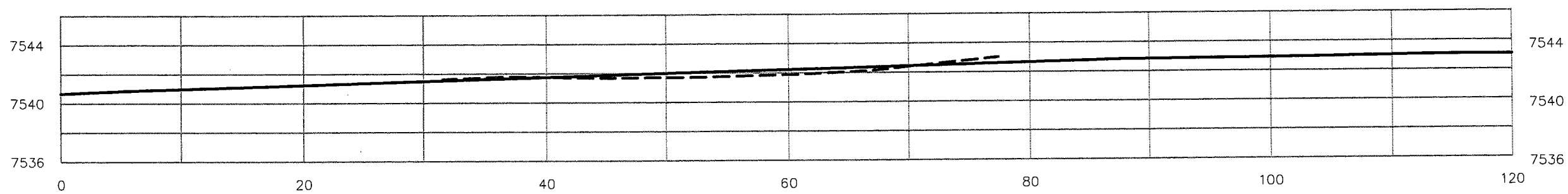
0+40



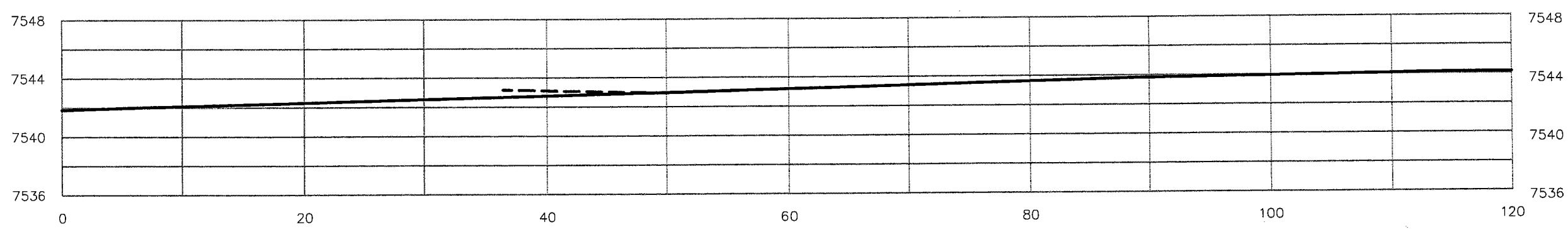
0+30



0+20



0+10



LAND & WATER CONSULTING, INC.

MORRISON MAIERLE, Inc.

YMC
GOLF COURSE WETLAND RESTORATION PROJECT

SCALE: 1" =10ft	DRAWN BY: RAA	CHECKED BY: P.C.	
PROJECT NUMBER: 140347	DATE: 5-29-01	FINAL APPROVAL: P.C.	CLIENT: YMC
LOCATION: Big Sky, Montana	FILENAME: G4-PLOT-LW.dwg		FIELD WORK: KT
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1	DRAWN BY: KW
	REVISIONS: -		CHECKED BY:

DATE: 12/18/01
SCALE: NOTED
PROJ #:

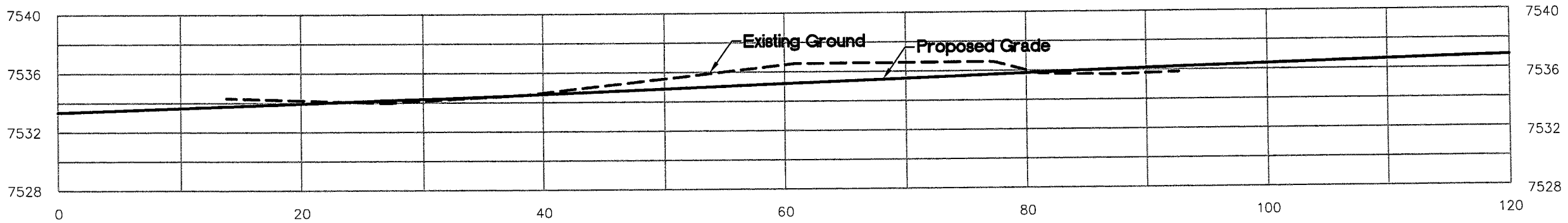
PLOTTED DATE: Jun/08/2004
DRAWING NAME: LN140347 Golf Course\dwg\grading Plan\G4-PLOT-LW.dwg
SHEET ___ PAGE OF 1—PAGE

A-30

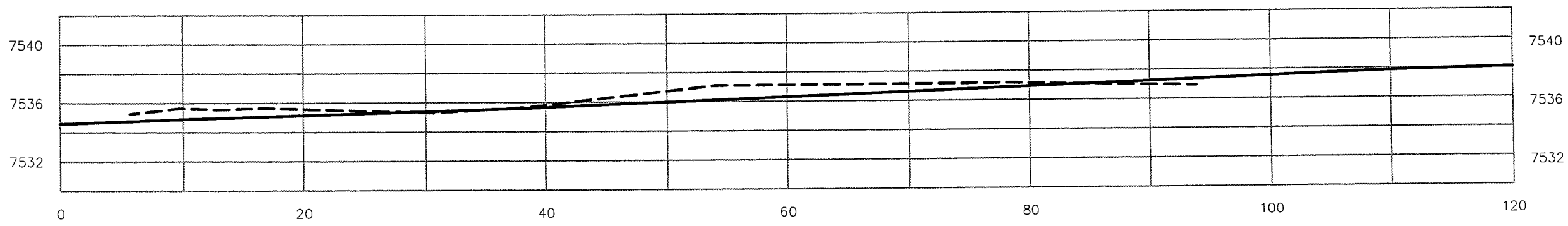
Sheet A-31: Wetland G-4 Grading Cross Sections

SCALE 1"= 10ft

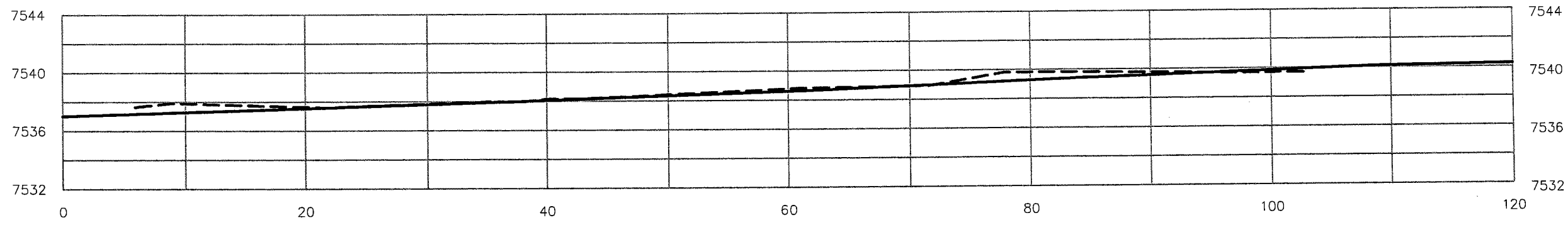
0+80



0+70



0+50



LAND & WATER CONSULTING, INC.
P.O. BOX 4596
Missoula, MT 59806

MORRISON MAIERLE, Inc.

SCALE: 1" =10ft	DRAWN BY: RAA	CHECKED BY: P.C.
PROJECT NUMBER: 140347	DATE: 1-29-02	FINAL APPROVAL: P.C.
LOCATION: Big Sky, Montana	FILENAME: G4-PLOT-LW.dwg	CLIENT: YMC
DESCRIPTION:	SHEET: 1 of 1 FIGURE: 1	FIELD WORK: MT DATE: 12/19/01
	REVISION# -	DRAWN BY: KW SCALE: NOTED
		CHECKED BY: PROJ #:

YMC GOLF COURSE WETLAND RESTORATION PROJECT

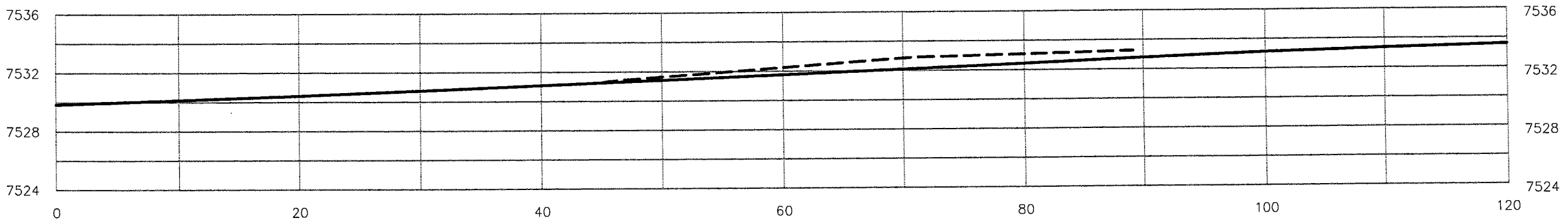
PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G4-PLOT-LW.dwg
SHEET PAGE OF 1-PAGE

A-31

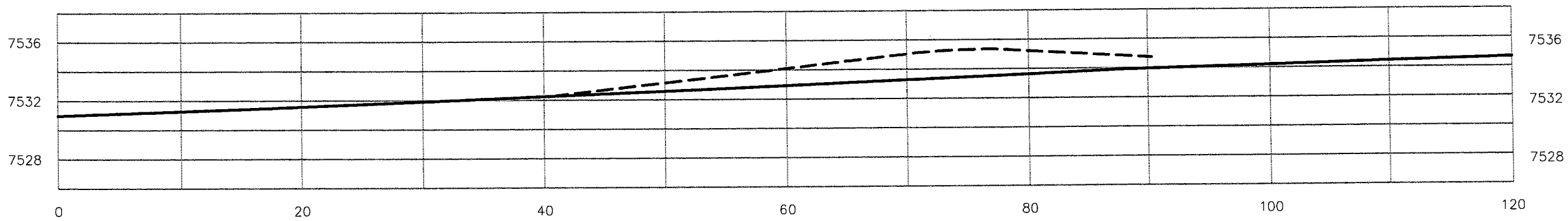
Sheet A-32: Wetland G-4 Grading Cross Sections

SCALE 1"= 10FT

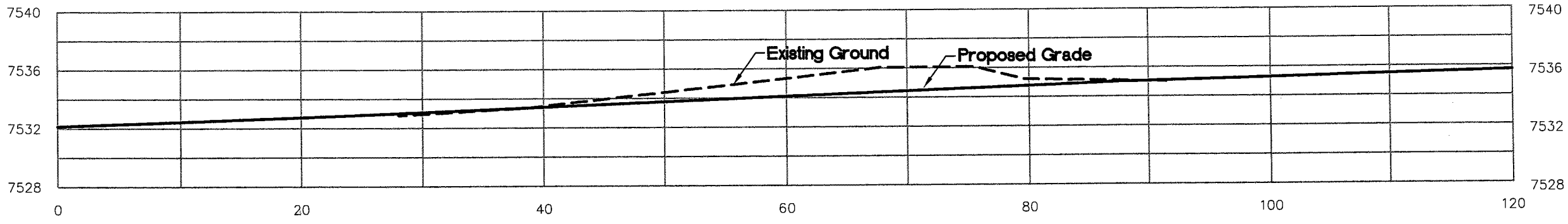
1+10



1+00



0+90



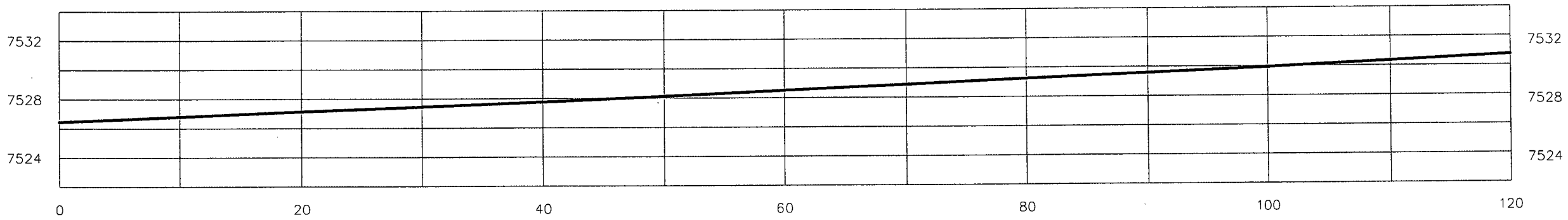
LAND & WATER CONSULTING, INC. P.O. BOX 4894 Missoula, MT 59807		MORRISON MAIERLE, Inc. An Employee-Owned Company	YMC GOLF COURSE WETLAND RESTORATION PROJECT
SCALE: 1" = 10ft	DRAWN BY: RAA	CHECKED BY: P.C.	
PROJECT NUMBER: 140347	DATE: 1-23-02	FINAL APPROVAL: P.C.	CLIENT: YMC
LOCATION: Big Sky, Montana	FILENAME: G4-PLOT-LW.dwg		FIELD WORK: MT — DATE: 12/19/01
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1	DRAWN BY: KW — SCALE: NOTED
	REVISION # -		CHECKED BY: — PROJ #:
			PLOTTED DATE: Jun/08/2004
			DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G4-PLOT-LW.dwg
			SHEET ___ PAGE OF ___ PAGE

A-32

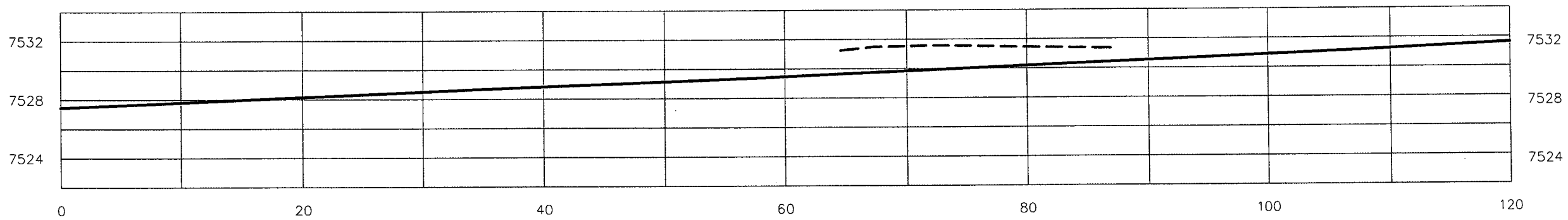
Sheet A-33: Wetland G-4 Grading Cross Sections

SCALE 1"= 10ft

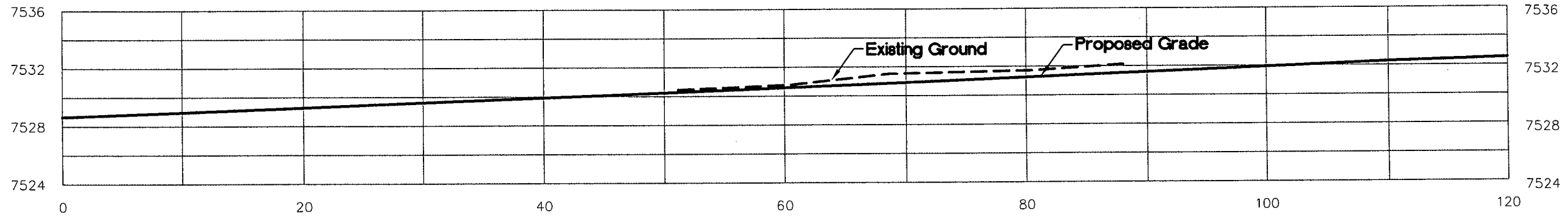
1+40



1+30

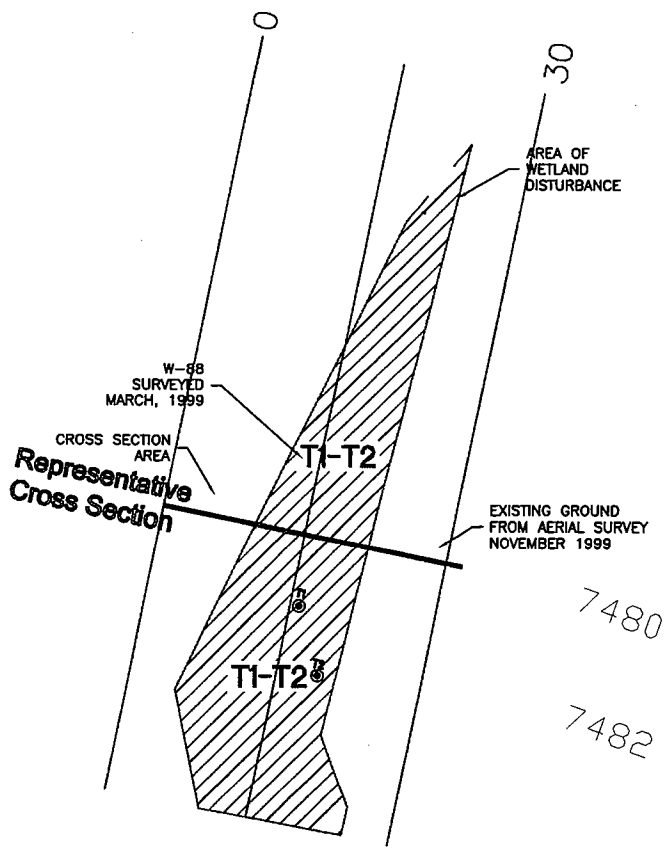


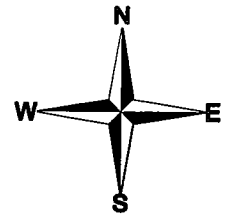
1+20



SCALE: 1" = 10ft	LAND & WATER CONSULTING, INC. P.O. BOX 8954 Missoula, MT 59807		YMC GOLF COURSE WETLAND RESTORATION PROJECT
PROJECT NUMBER: 140347	DRAWN BY: BAA	CHECKED BY: P.C.	
LOCATION: Big Sky, Montana	DATE: 5-29-02	FINAL APPROVAL: P.C.	MORRISON MAIERLE, INC.
DESCRIPTION:	FILENAME: G4-PLOT-LW.dwg	CLIENT: YMC	PLOTTED DATE: Jun/08/2004
	SHEET: 1 of 1	FIELD WORK: KIT	DRAWING NAME: L:\140347 Golf Course\dwg\planting Plan\G4-PLOT-LW.dwg
	FIGURE: 1	DRAWN BY: KW	SHEET 1 PAGE OF 1-PAGE
	REVISION # -	DATE: 12/19/01	A-33
		SCALE: NOTED	
		CHECKED BY:	
		PROJ #:	

A-34: Wetland G-5 Grading Plan





SCALE 1"= 30ft

LAND & WATER CONSULTING, INC.
P.O. BOX 4884
EVERGREEN, COLORADO 80437

MORRISON MAIERLE, Inc.
An Employee-Owned Company

CLIENT: CLIENT

FIELD WORK: KM
DRAWN BY: KW
CHECKED BY:

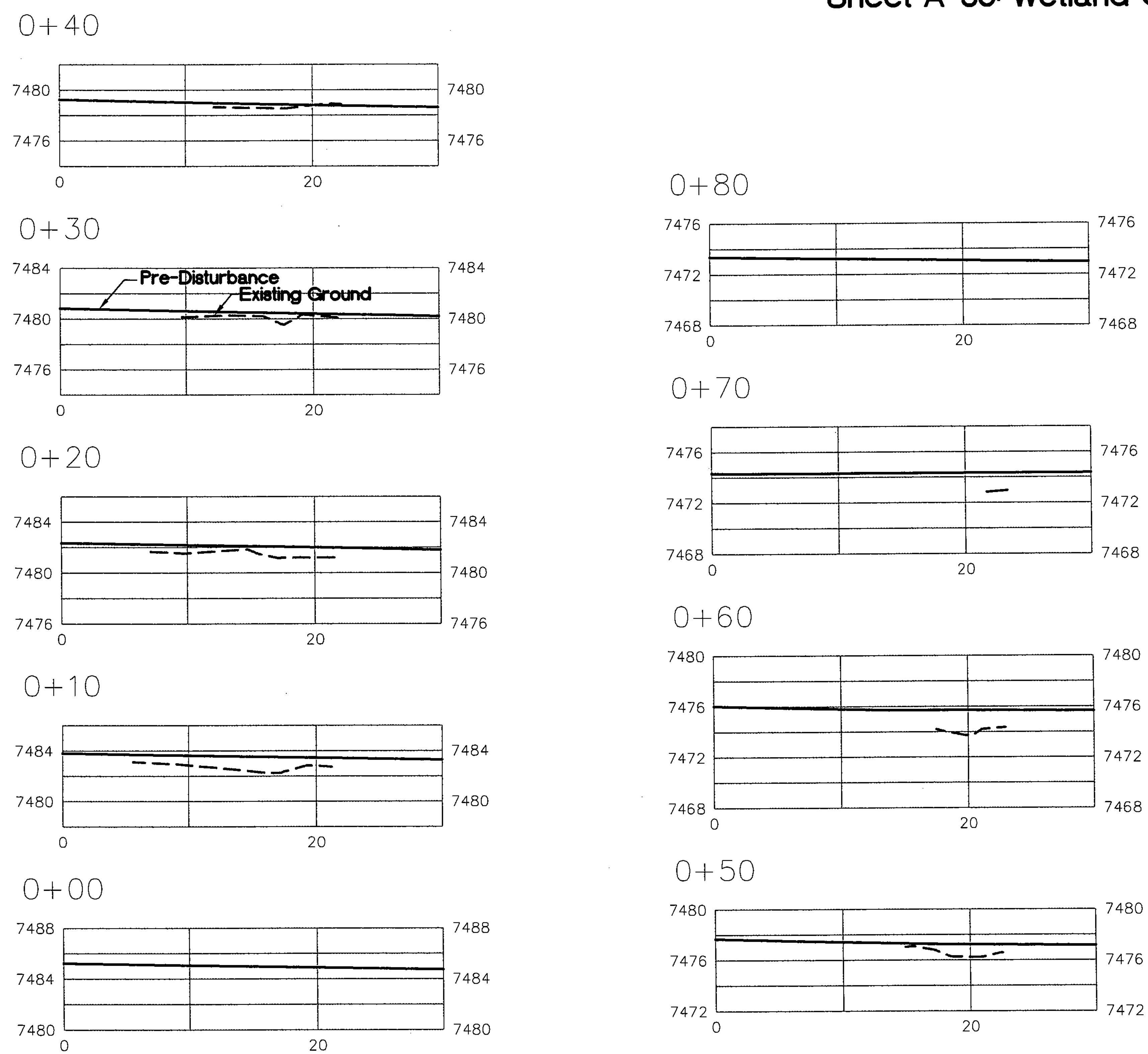
DATE: 12/19/01
SCALE: NOTED
PROJ #:

YMC GOLF COURSE WETLAND RESTORATION PROJECT

PLOTTED DATE: Jun/08/2004
DRAWING NAME: I:\140347 Golf Course\dwg\grading Plan\GS-G-PLOT-LS.dwg
SHEET ___ PAGE OF ___ T-PAGE

Sheet A-35: Wetland G-5 Grading Cross Sections

Scale 1"= 10ft



YMC
GOLF COURSE WETLAND
RESTORATION PROJECT
A-35

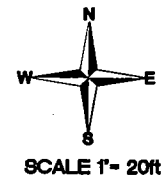
MORRISON MAIERLE, INC.

LAND & WATER CONSULTING, INC.

DATE: 12/19/01

PLOTTED DATE: Jun/08/2004

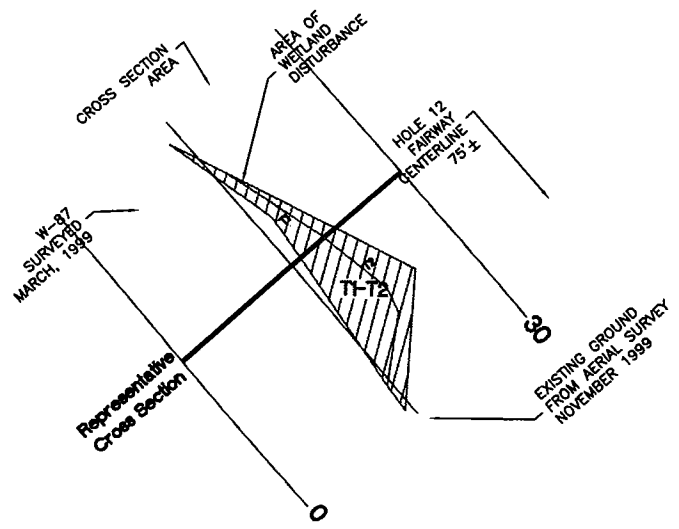
A-36: Wetland G-6 Grading Plan



SCALE 1"= 20ft

7490

7492



LAND & WATER CONSULTING, INC.
P.O. BOX 4984
Missoula, MT 59807

MORRISON MAIERLE, Inc.
An Employee Owned Company
Engineering
Surveying
Since 1945

CLIENT: CLIENT

FIELD WORK: KIT
DRAWN BY: KW
CHECKED BY:

DATE: 12/19/01
SCALE: NOTED
PROJ #:

YMC
GOLF COURSE WETLAND RESTORATION PROJECT

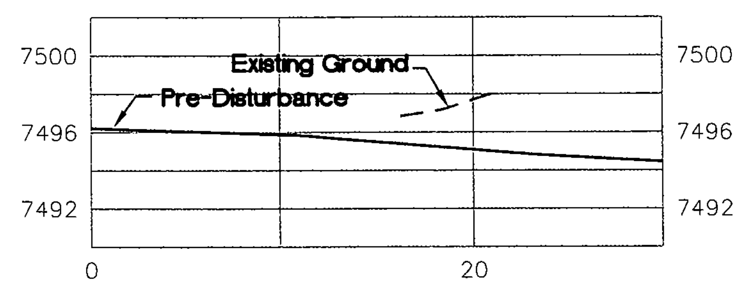
PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\160347 Golf Course\dwg\grading Plan\03-6-mA-36.
SHEET PAGE OF 1-PAGE

A-36

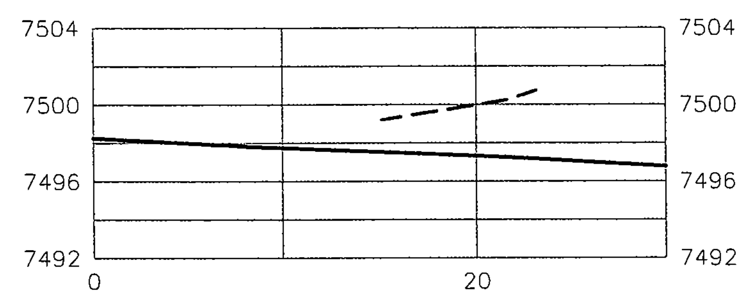
Sheet A-37: Wetland G-6 Grading Cross Sections

Scale 1"= 10ft

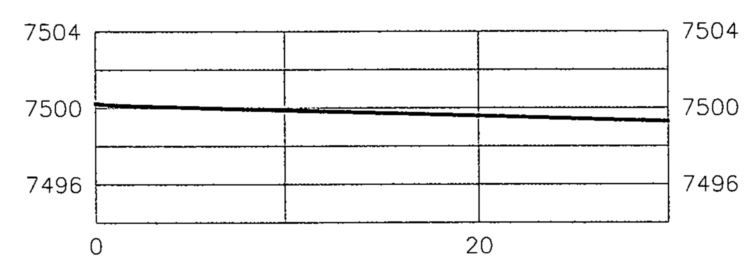
0+20



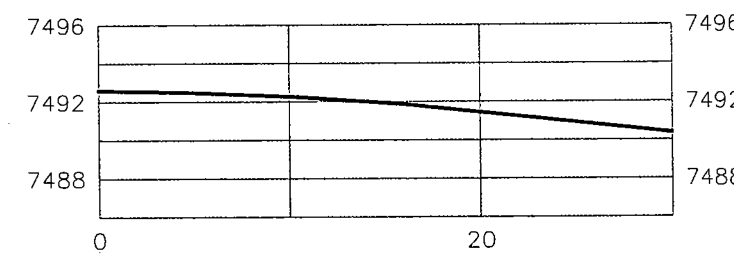
0+10



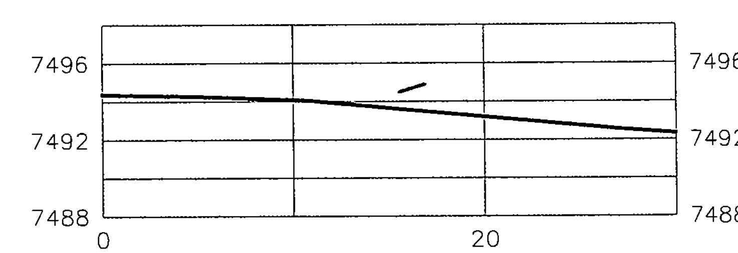
0+00



0+40

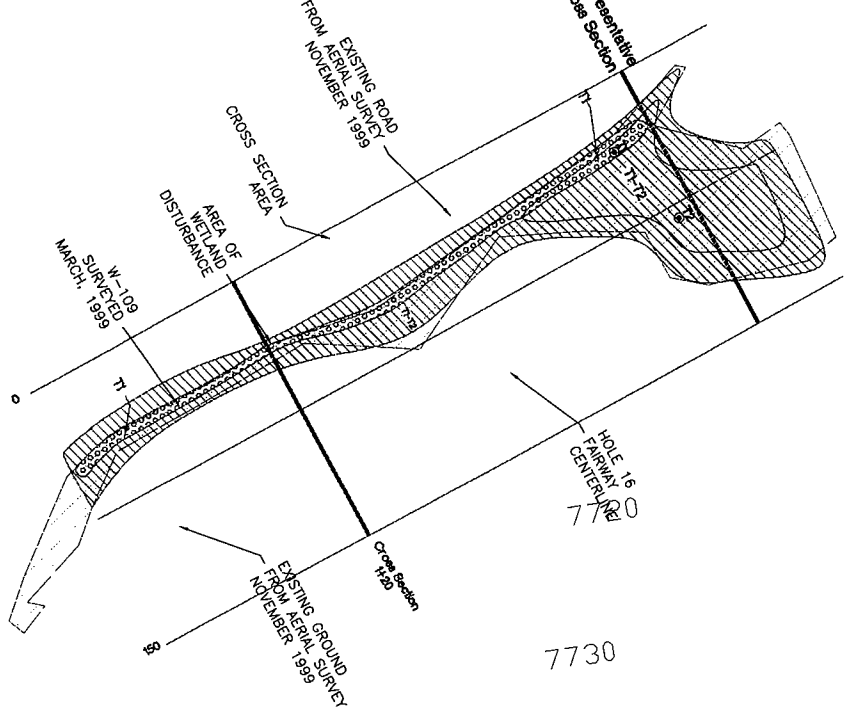


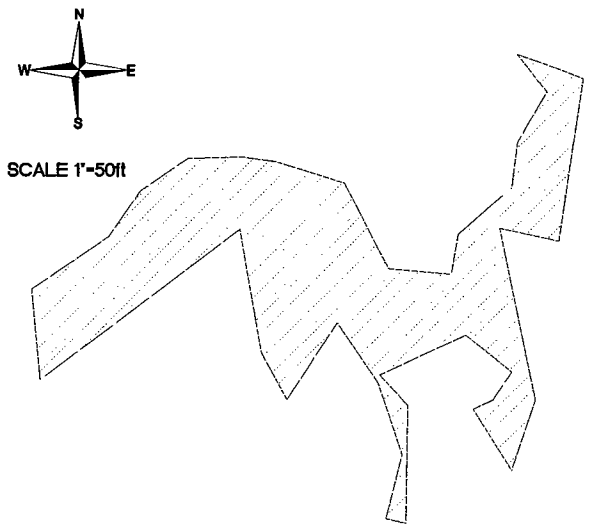
0+30



YMC
GOLF COURSE WETLAND
RESTORATION PROJECT
A-37

Sheet A-38: Wetland G-7 Grading Plan





SCALE 1"=50ft

7720

7730

SCALE: 1" = 50ft	DRAWN BY: RAA	CHECKED BY: P.C.
PROJECT NUMBER: 140347	DATE: 5-29-02	FINAL APPROVAL: P.C.
LOCATION: Big Sky, Montana	FILENAME: G7-PLOT-LW.dwg	
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1
	REVISIONS: -	△

LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

MORRISON MAIERLE, Inc.
P.O. Box 1113, 5th Township Blvd, Bozeman, MT, 59771 - Phone: (406) 587-0721 Fax: (406) 587-1476

CLIENT: YMC

FIELD WORK: FIELD
DRAWN BY: D-BY
CHECKED BY: C-BY

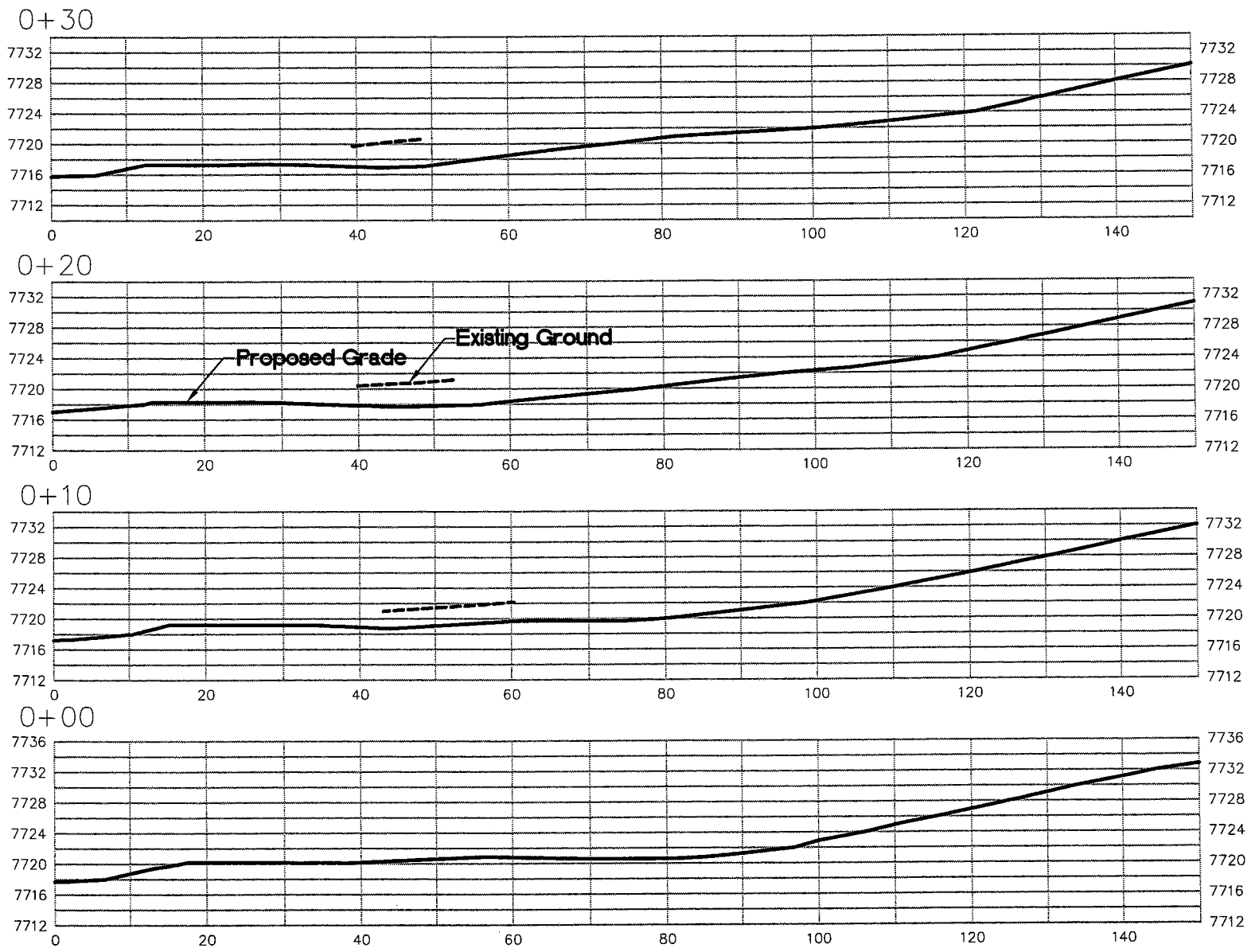
DATE: DATE
SCALE: SCALE
PROJ #: PROJECT

YMC
GOLF COURSE WETLAND RESTORATION PROJECT

PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G7A-38.dwg
SHEET F2 OF

Sheet A-39: Wetland G-7 Grading Cross Sections

SCALE 1"=20ft



LAND & WATER CONSULTING, INC.
P.O. BOX 6864
Missoula, MT 59807

MORRISON MAIERLE, Inc.

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

CLIENT: YMC

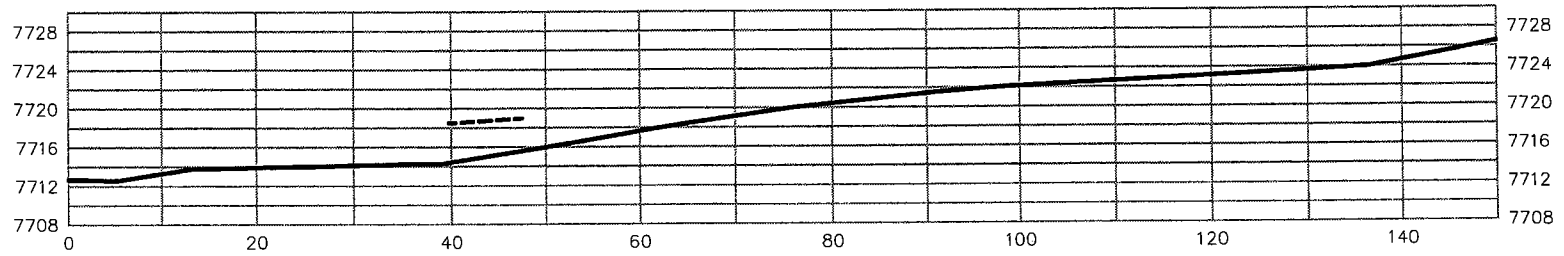
FIELD WORK: FIELD
DRAWN BY: D-BY
CHECKED BY: C-BY
DATE: DATE
SCALE: SCALE
PROJ. #: PROJECT

PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\A-39.DGN
SHEET 52 OF

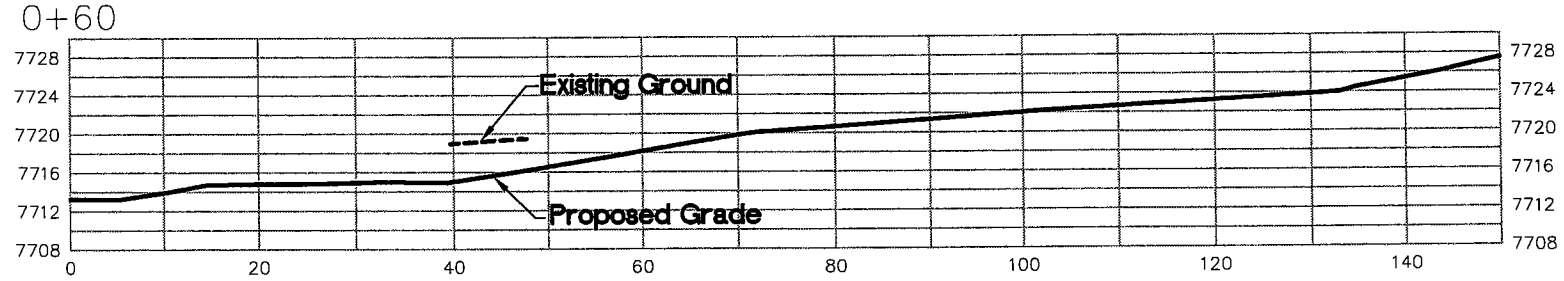
Sheet A-40: Wetland G-7 Grading Cross Sections

SCALE 1"=20ft

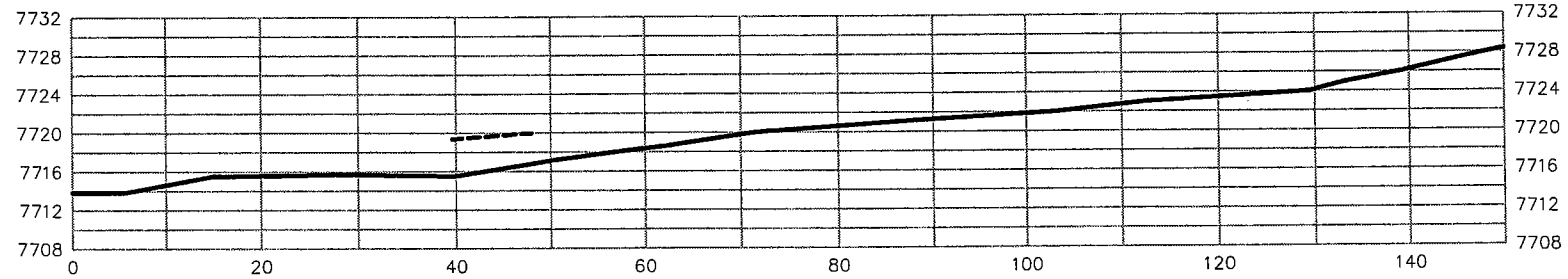
0+70



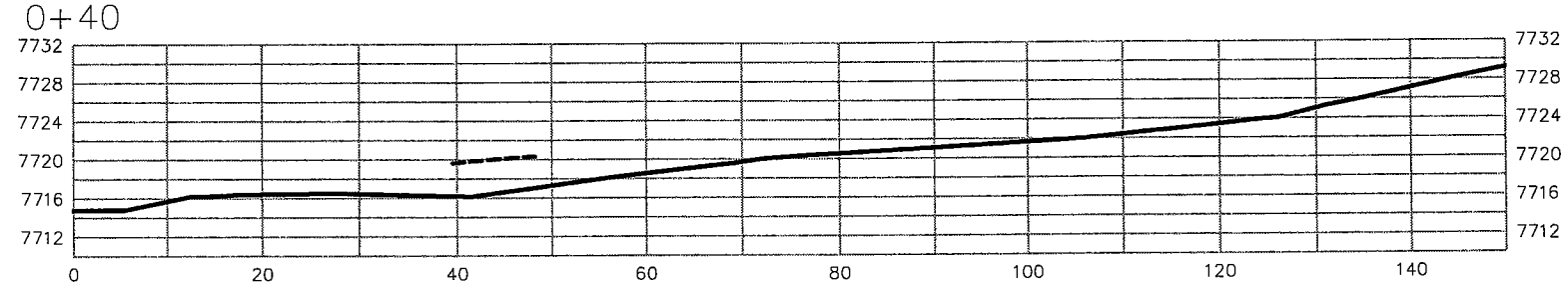
0+60



0+50



0+40



LAND & WATER CONSULTING, INC.
P.O. BOX 8954
Missoula, MT 59807

MORRISON MAIERLE, Inc.

YMC
GOLF COURSE WETLAND RESTORATION PROJECT

CLIENT: YMC

FIELD WORK: FIELD
DRAWN BY: D-BY
CHECKED BY: C-BY
DATE: DATE
SCALE: SCALE
PROJ #: PROJECT

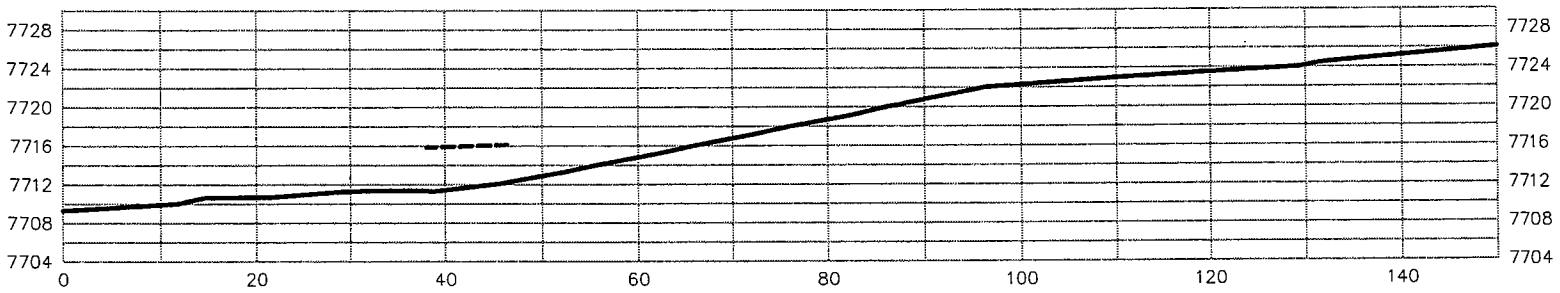
PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G7-PLOT-LW.dwg
SHEET F2 OF

A-40

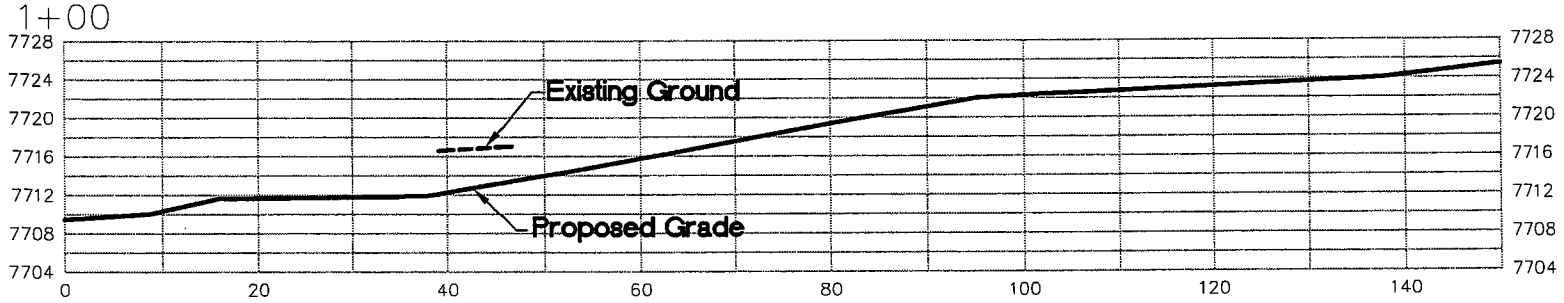
Sheet A-41: Wetland G-7 Grading Cross Sections

SCALE 1"=20ft

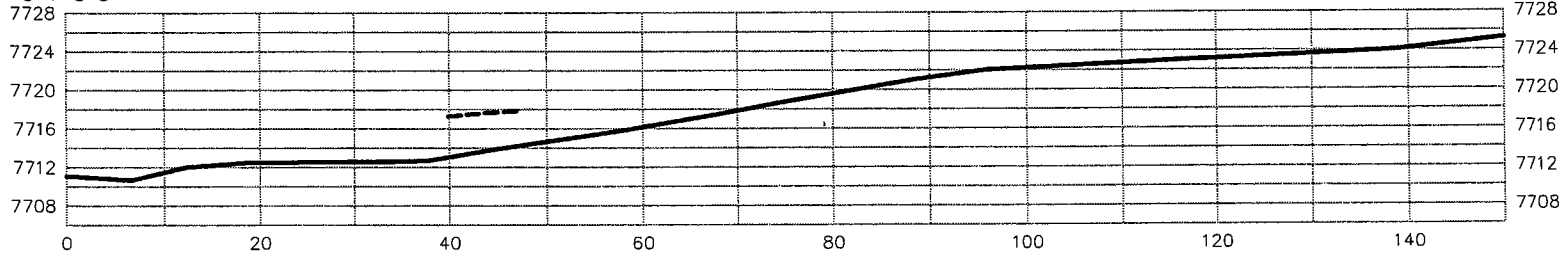
1+10



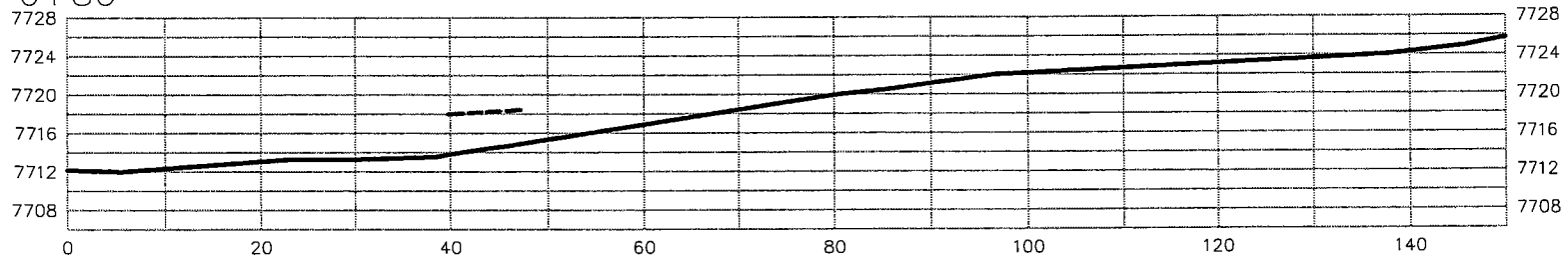
1+00



0+90



0+80



LAND & WATER CONSULTING, INC.
P.O. BOX 8894
Missoula, MT 59807

MORRISON MAIERLE, Inc.

CLIENT: YMC

FIELD WORK: FIELD
DRAWN BY: D-BY
CHECKED BY: C-BY

DATE: DATE
SCALE: SCALE
PROJ. #: PROJECT

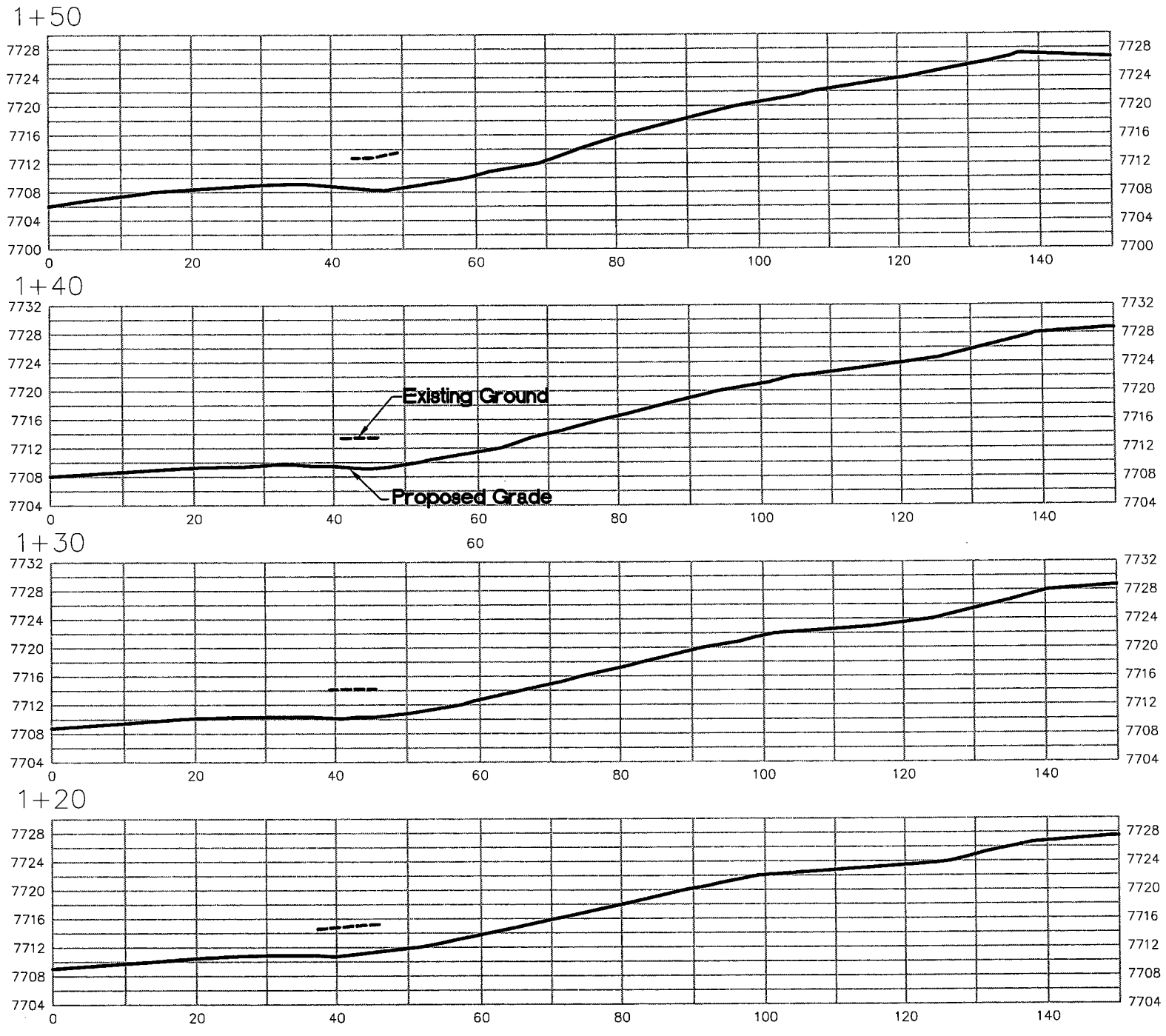
YMC
GOLF COURSE WETLAND RESTORATION PROJECT

PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\07-PLOT-LW.dwg
SHEET 27 OF

A-41

Sheet A-42: Wetland G-7 Grading Cross Sections

SCALE 1"=20ft



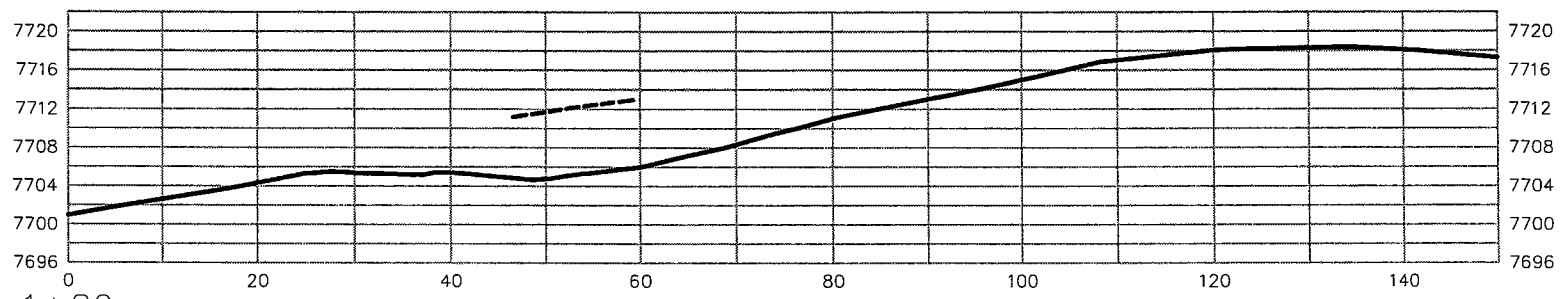
LAND & WATER CONSULTING, INC. P.O. BOX 8854 Missoula, MT 59807		MORRISON MAIERLE, Inc. An Employee-Owned Company	YMC GOLF COURSE WETLAND RESTORATION PROJECT
SCALE: 1" =20ft	DRAWN BY: PAA	CHECKED BY: P.C.	CLIENT: YMC		
PROJECT NUMBER: 140047	DATE: 6-28-02	FINAL APPROVAL: P.C.			
LOCATION: Big Sky, Montana	PLOTTED BY: PLOT-LW.dwg		FIELD WORK: FIELD	DATE: DATE	PLOTTED DATE: Jun/08/2004
DESCRIPTION:	SHEET: 2 of 3	FIGURE: 1	DRAWN BY: D-BY	SCALE: SCALE	DRAWING NAME: L:\140047 Golf Course\dwg\grading Plan\G7-PLOT-LW.dwg
	REVISIONS: -		CHECKED BY: C-BY	PROJ. #: PROJECT	SHEET: F2 OF

A-42

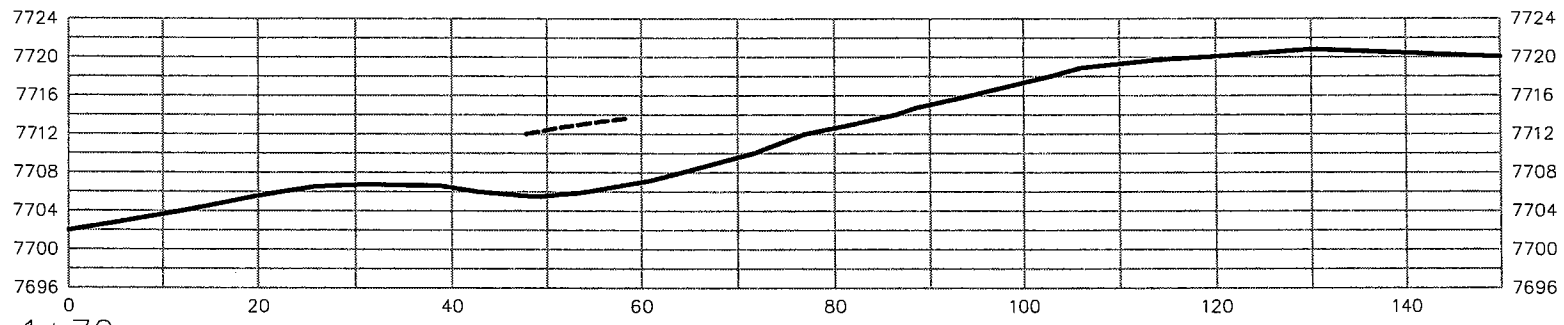
Sheet A-43: Wetland G-7 Grading Cross Sections

SCALE 1"=20ft

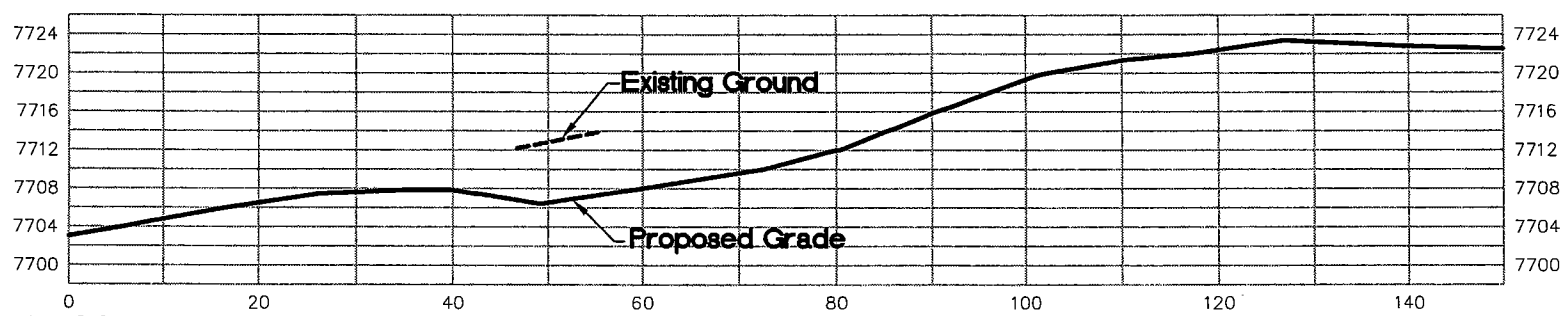
1+90



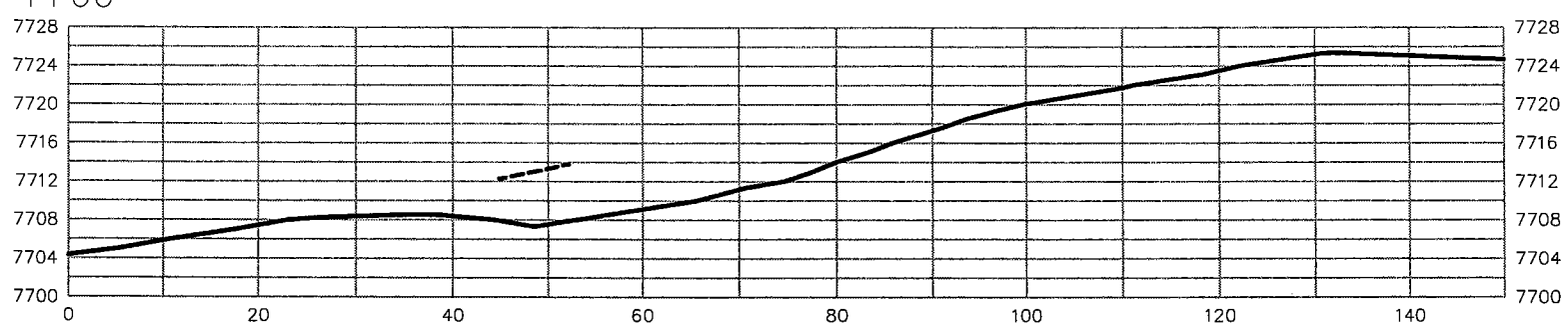
1+80



1+70



1+60



LAND & WATER CONSULTING, INC.
P.O. BOX 5894
Missoula, MT 59807

MORRISON MAIERLE, Inc.

CLIENT: YMC

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

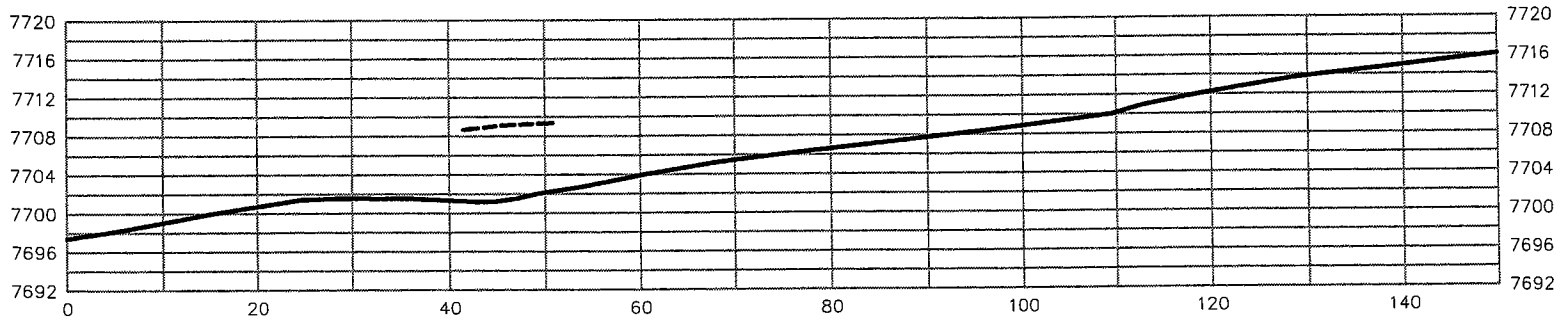
PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G77-PLOT-LW.dwg

A-43

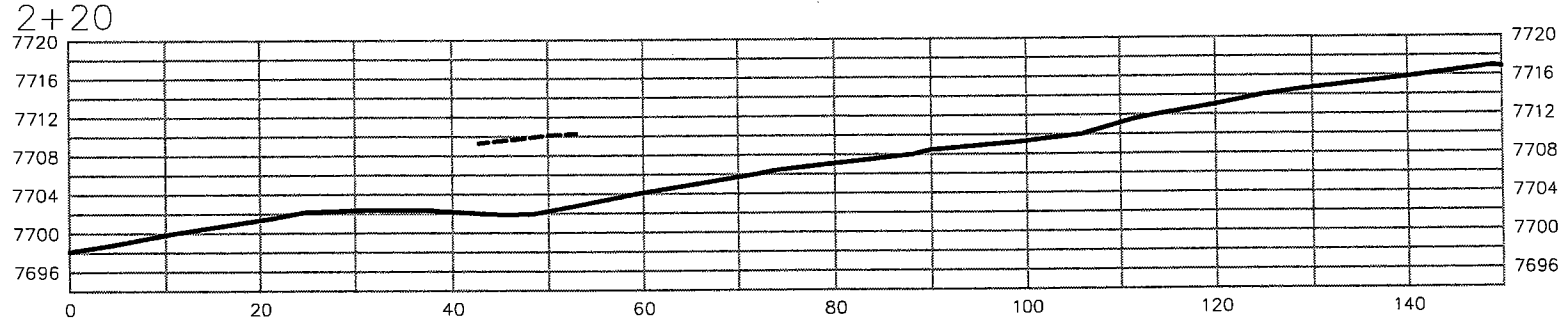
Sheet A-44: Wetland G-7 Grading Cross Sections

SCALE 1"=20ft

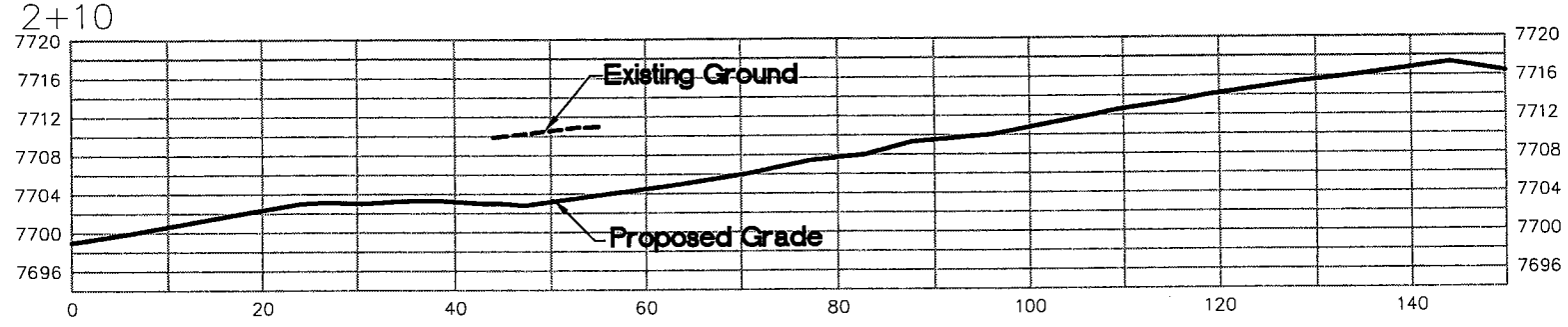
2+30



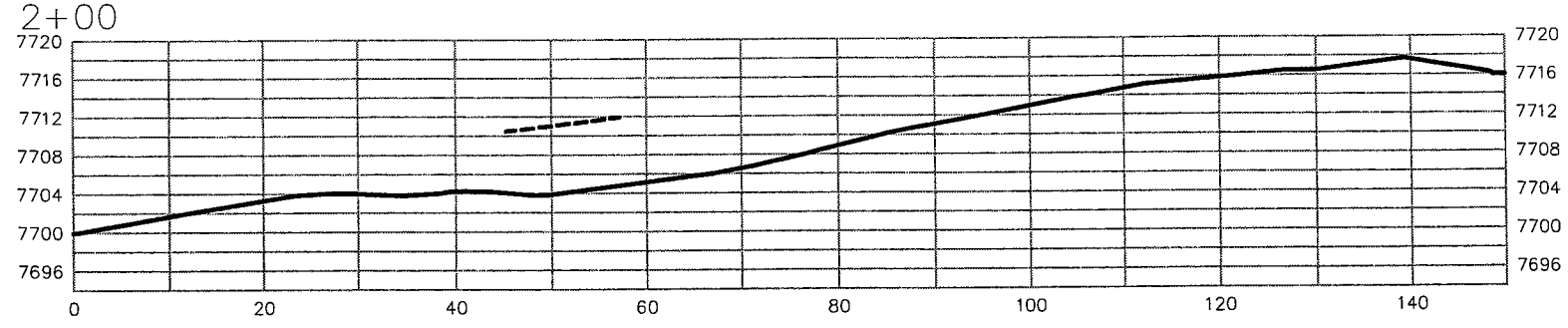
2+20



2+10



2+00



LAND & WATER CONSULTING, INC.
P.O. BOX 8854
Missoula, MT 59807

MORRISON MAIERLE, Inc.
An Engineer-Led Company

CLIENT: YMC

FIELD WORK: FIELD
DRAWN BY: D--BY
CHECKED BY: C--BY

DATE: DATE
SCALE: SCALE
PROJ. #: PROJECT

YMC
GOLF COURSE WETLAND RESTORATION PROJECT

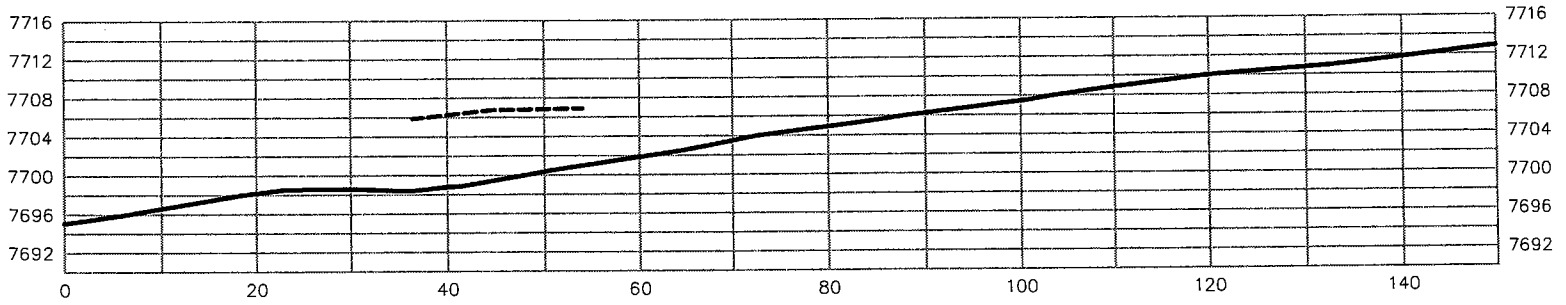
PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\GT-PLOT-LP.dwg
SHEET F2 OF

A-44

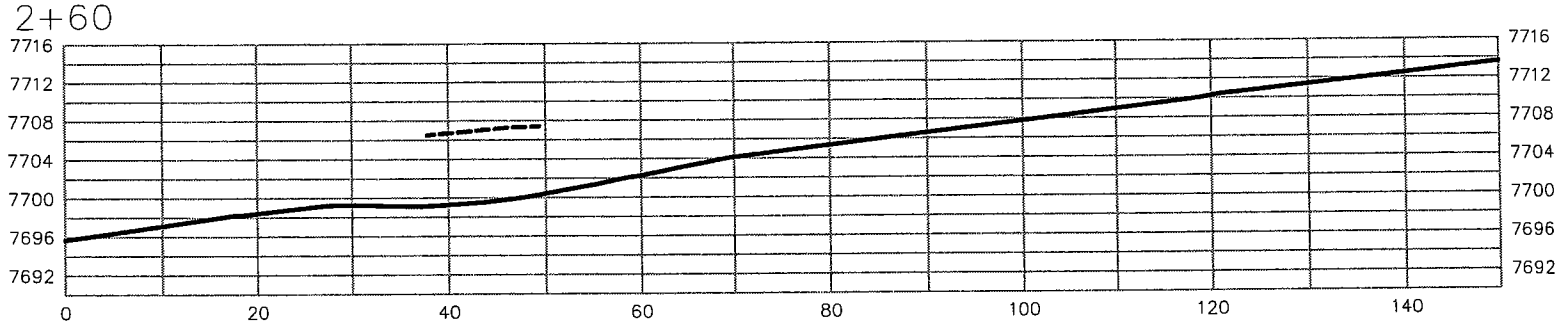
Sheet A-45: Wetland G-7 Grading Cross Sections

SCALE 1"=20ft

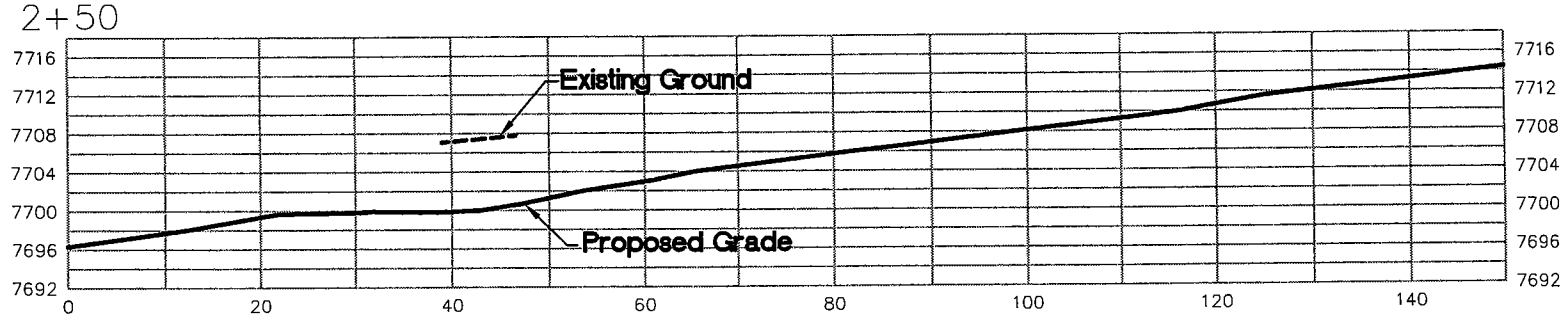
2+70



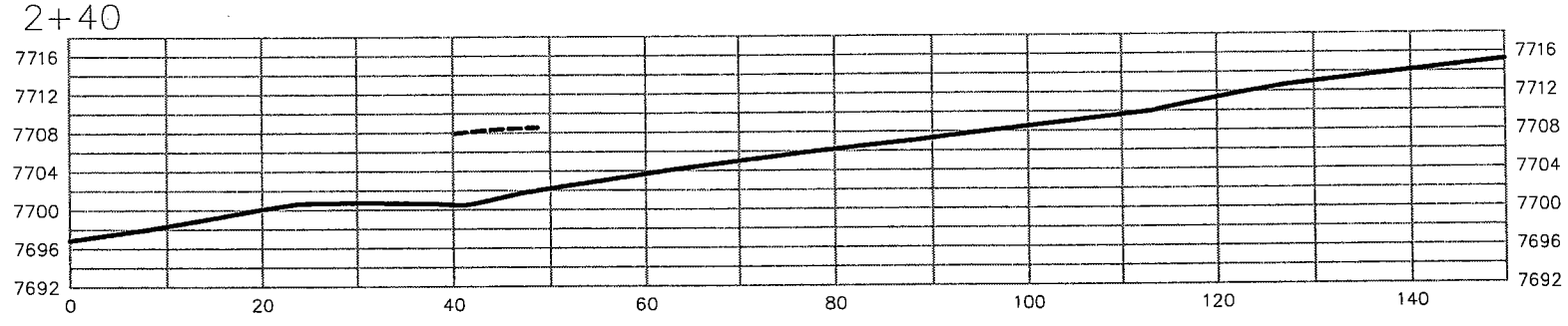
2+60



2+50



2+40



LAND & WATER CONSULTING, INC.
P.O. BOX 8954
Missoula, MT 59807

MORRISON MAIERLE, Inc.

CLIENT: YMC

FIELD WORK: FIELD
DRAWN BY: D-BY
CHECKED BY: C-BY

DATE: DATE
SCALE: SCALE
PROJ #: PROJECT

YMC GOLF COURSE WETLAND RESTORATION PROJECT

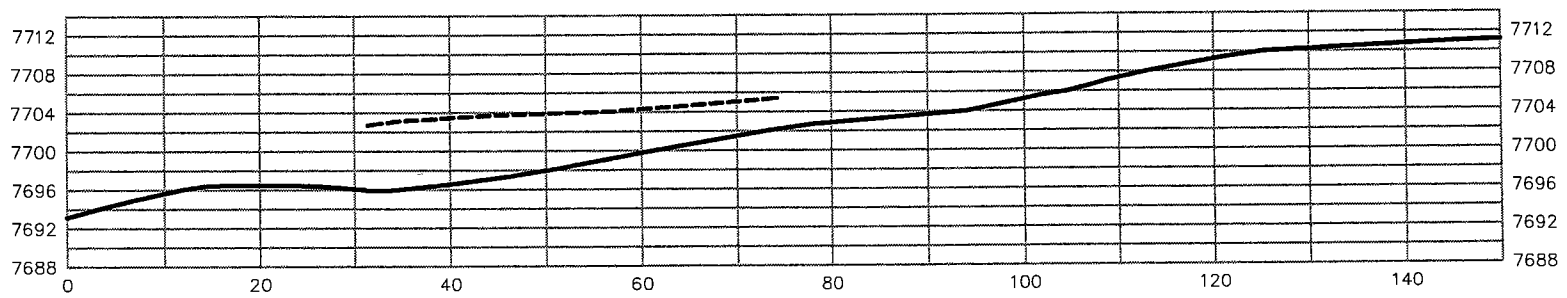
PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G7-PLOT-LW.dwg
SHEET FZ OF

A-45

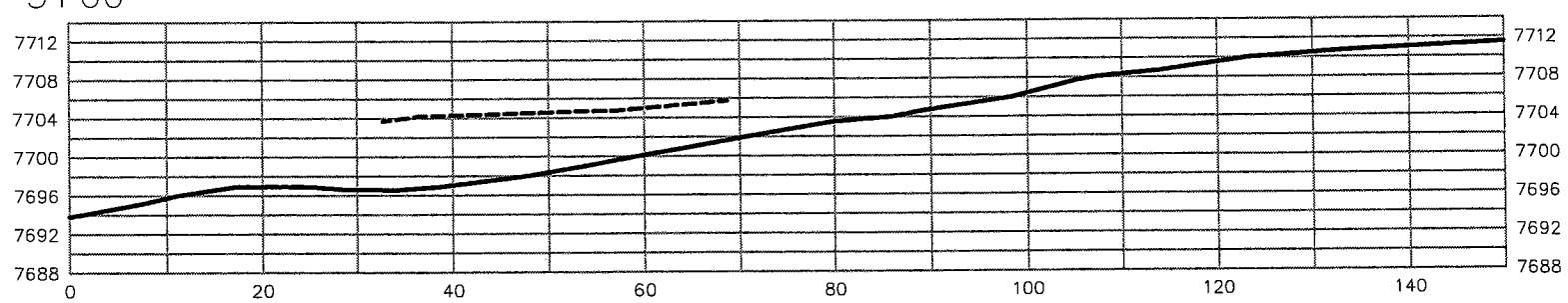
Sheet A-46: Wetland G-7 Grading Cross Sections

SCALE 1"=20ft

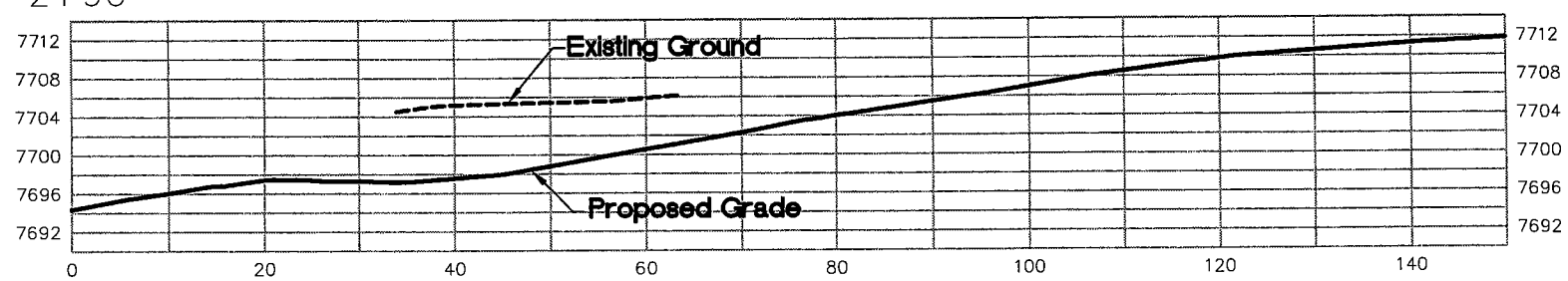
3+10



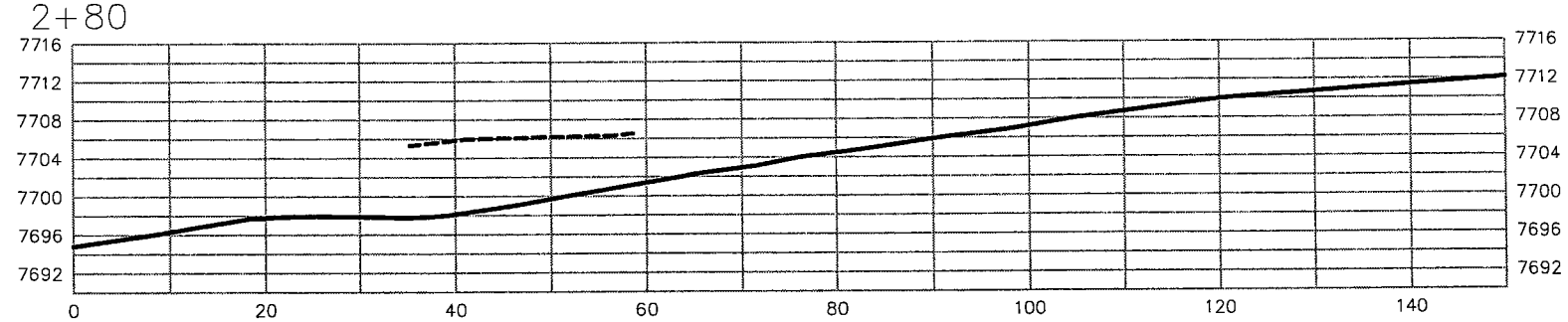
3+00



2+90



2+80



LAND & WATER CONSULTING, INC.
P.O. BOX 8994
Missoula, MT 59807

MORRISON MAIERLE, Inc.

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

CLIENT: YMC

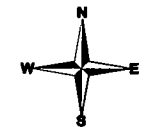
FIELD WORK: FIELD
DRAWN BY: D-BY
CHECKED BY: C-BY

DATE: DATE
SCALE: SCALE
PROJ #: PROJECT

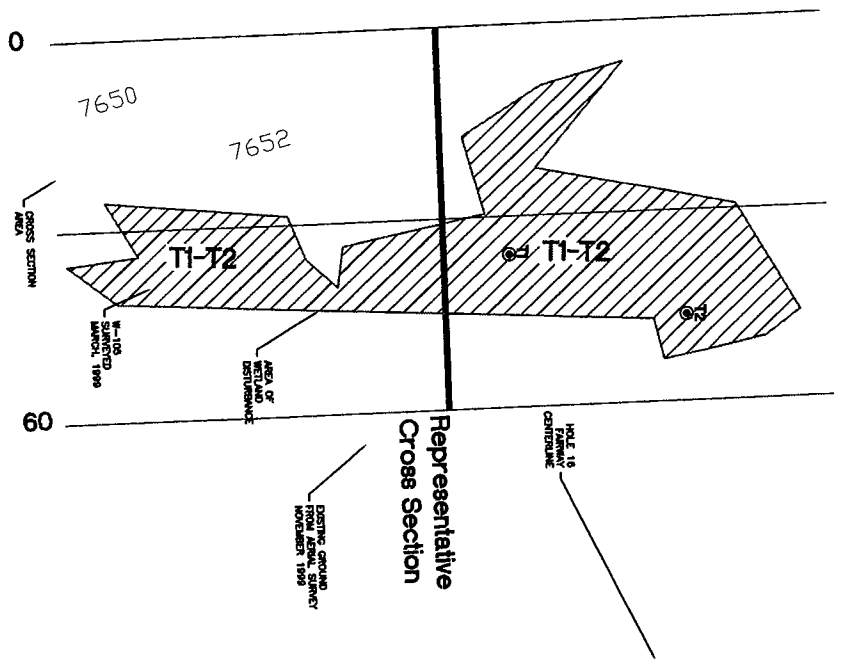
PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G7-PLOT-LW.dwg
SHEET F2 OF

A-46

A-47: Wetland G-8 Grading Plan



SCALE 1"=30ft



LAND & WATER CONSULTING, INC. P.O. BOX 8954 Missoula, MT 59807		
SCALE 1" =30ft	DRAWN BY: BAA	CHECKED BY: P.C.
PROJECT NUMBER: 140347	DATE: 5-28-02	FINAL APPROVAL: P.C.
LOCATION: Big Sky, Montana	FILENAME: G8-9-PLOT-LSE.dwg	
DESCRIPTION:	SHEET: 1 of 1	FIELD BK:
	REVISION: -	△

MORRISON MAIERLE, Inc.
An Employee-Owned Company
PO Box 1113, 101 Technology Blvd, Bozeman, MT, 59771 - Phone (406) 582-0221 Fax (406) 582-0726

CLIENT: YMC

FIELD WORK: KIT
DRAWN BY: KW
CHECKED BY:

DATE: DATE
SCALE: AS-NOTED
PROJ #:

YMC GOLF COURSE WETLAND RESTORATION PROJECT

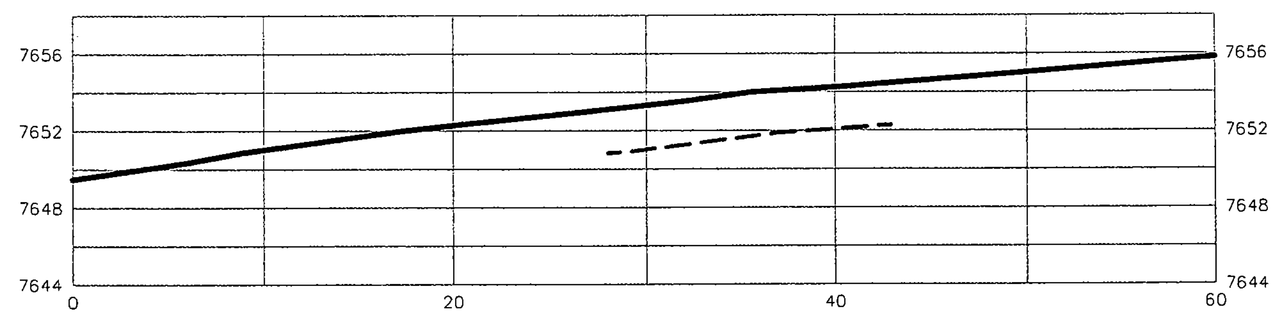
PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G8-9-PLOT-LSE.dwg
SHEET F2 OF

A-47

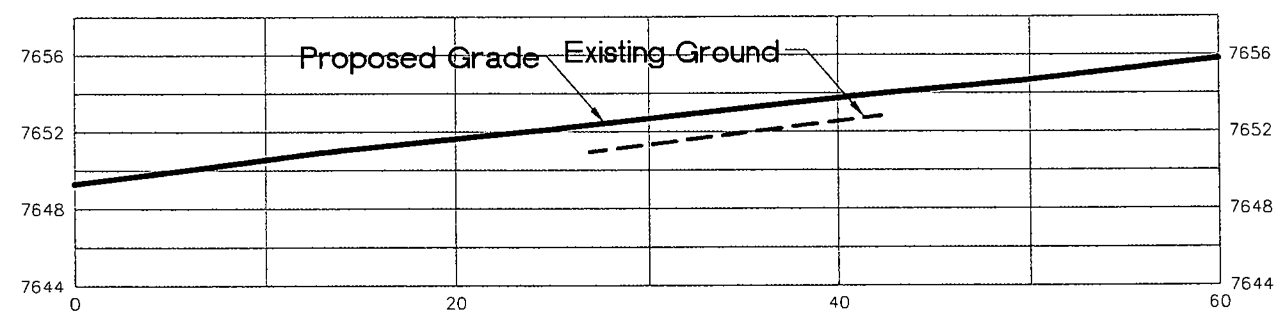
A-48: Wetland G-8 Grading Cross Sections

SCALE 1"=10ft

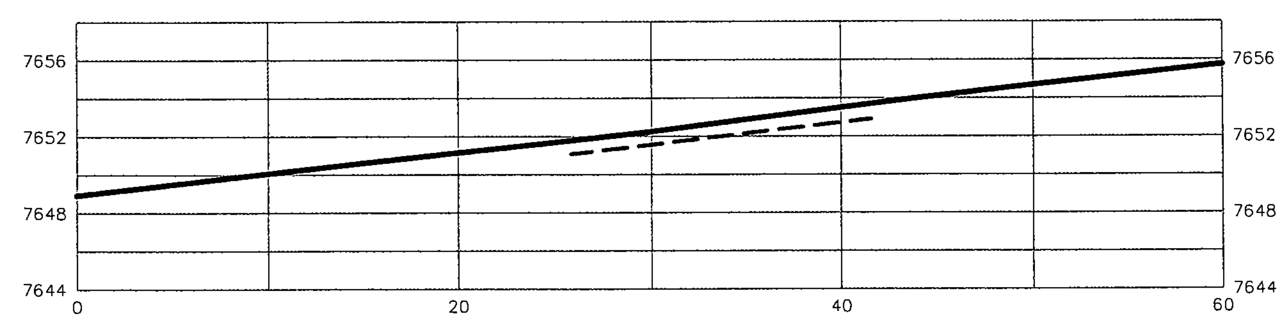
0+30



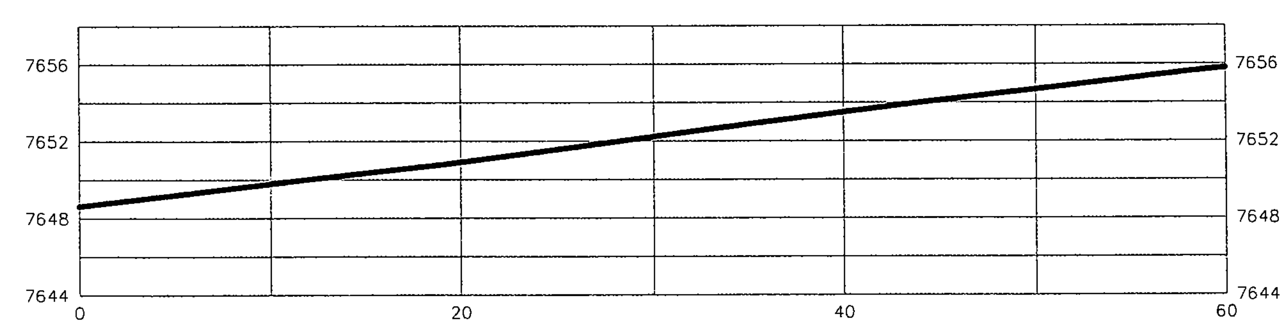
0+20



0+10



0+00

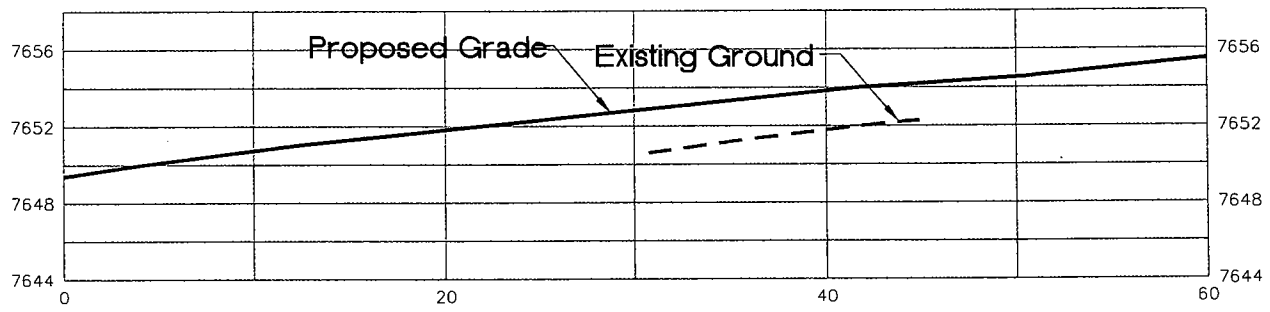


SCALE: 1" =10ft PROJECT NUMBER: 140347 LOCATION: Big Sky, Montana DESCRIPTION:	LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807 DRAWN BY: RAA · CHECKED BY: P.C. DATE: 5-29-02 · FINAL APPROVAL: P.C. FILENAME: G8-9-PLOT-LW.dwg SHEET: 1 of 1 · FIGURE: 1 REVISION# -	MORRISON MAIERLE, INC. CLIENT: YMC FIELD WORK: KIT · DATE: DATE DRAWN BY: KW · SCALE: AS-NOTED CHECKED BY: · PROJ #:	YMC GOLF COURSE WETLAND RESTORATION PROJECT PLOTTED DATE: Jun/08/2004 DRAWING NAME: SHEET F2 OF A-48

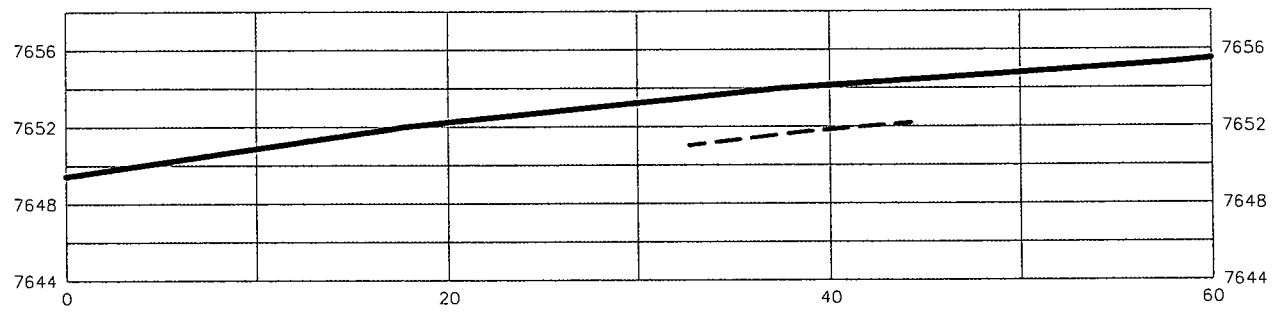
A-49: Wetland G-8 Grading Cross Sections

SCALE 1"=10ft

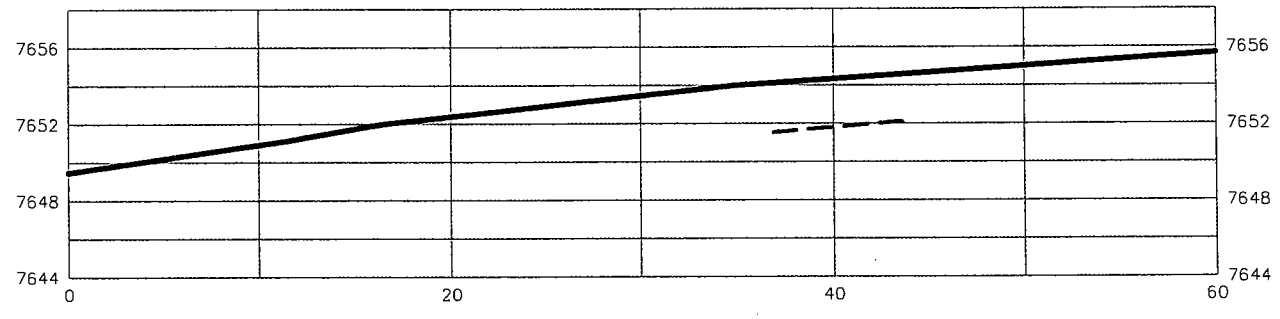
0+60



0+50



0+40



SCALE: 1" =10ft	DRAWN BY: RAA	CHECKED BY: P.C.
PROJECT NUMBER: 140347	DATE: 5-29-02	FINAL APPROVAL: P.C.
LOCATION: Big Sky, Montana	FILENAME: GB-9-PLOT-LW.dwg	
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1
	REVISION# -	△

LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

MORRISON MAIERLE, Inc.
An Employee-Owned Company
ENGINEERS SCIENTISTS SURVEYORS PLANNERS SINCE 1949
40 So. 11th, 201 Technology Blvd, Bozeman, MT. 59771 - Phone: (406) 587-4011 Fax: (406) 587-1178

CLIENT: TMC

FIELD WORK: KIT
DRAWN BY: KW
CHECKED BY:

DATE: DATE
SCALE: AS-NOTED
PROJ #:

YMC
GOLF COURSE WETLAND RESTORATION PROJECT

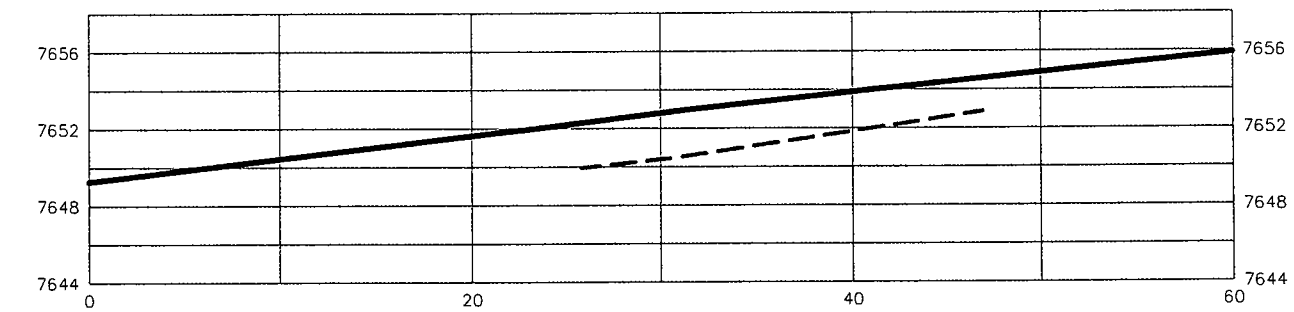
PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\GB-9-PLOT-LW.dwg
SHEET F2 OF

A-49

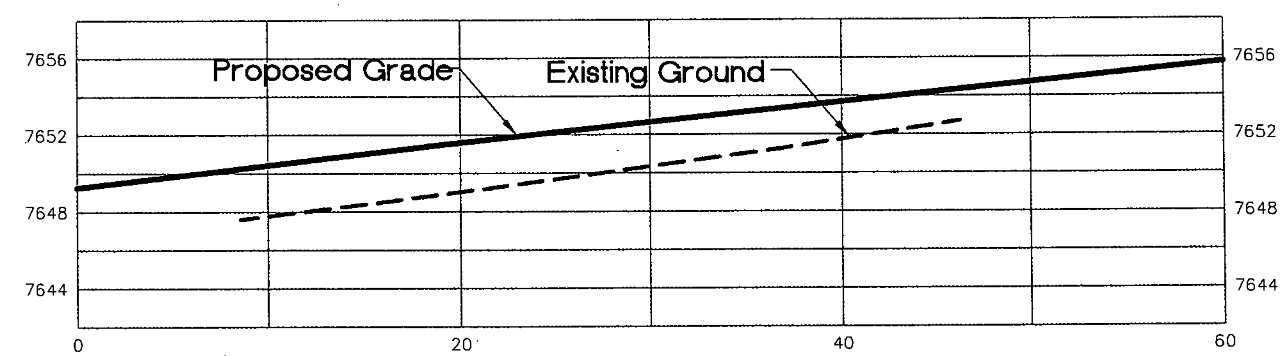
A-50: Wetland G-8 Grading Cross Sections

SCALE 1"=10ft

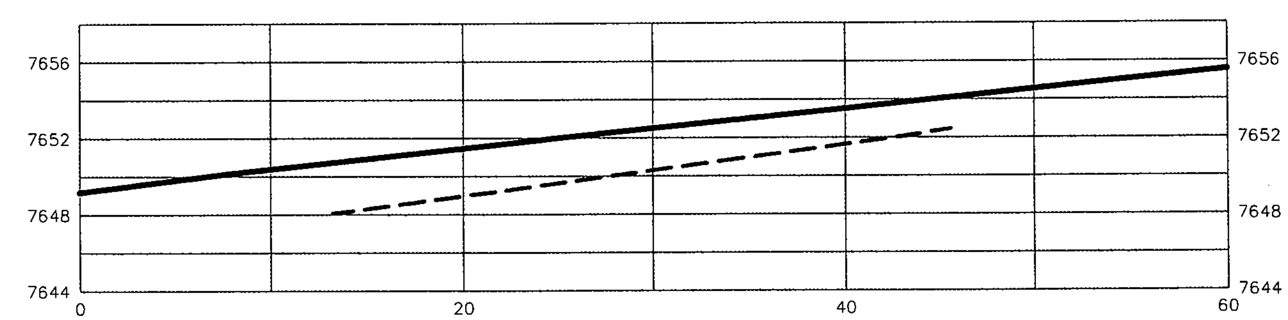
0+90



0+80



0+70

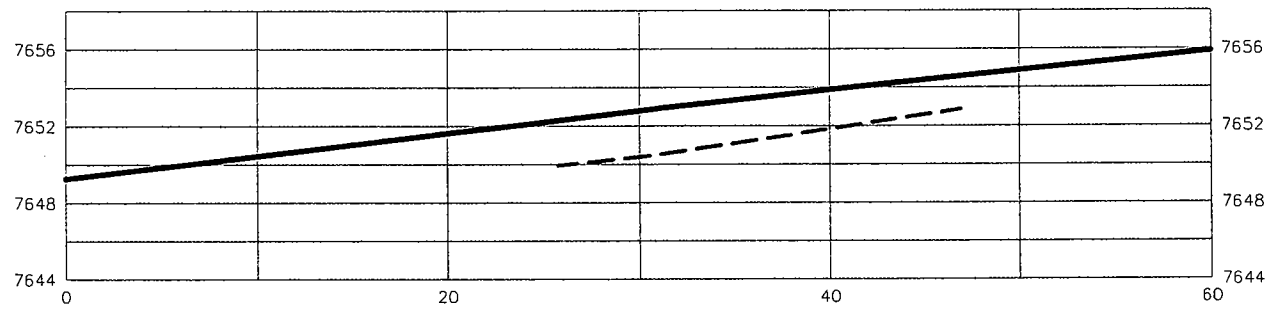


SCALE: 1" =10ft	LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807	MORRISON MAIERLE, INC. An Employee-Owned Company	YMC GOLF COURSE WETLAND RESTORATION PROJECT
PROJECT NUMBER: 140347	DRAWN BY: RAA / CHECKED BY: P.C.	CLIENT: YMC	PLOTTED DATE: Jun/08/2004
LOCATION: Big Sky, Montana	DATE: 5-29-02 / FINAL APPROVAL: P.C.	FIELD WORK: KIT / DATE: DATE	DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G8-9-PLOT-LW.dwg
DESCRIPTION:	FILENAME: G8-9-PLOT-LW.dwg	DRAWN BY: KW / SCALE: AS-NOTED	SHEET F2 OF
	SHEET: 1 of 1 / FIGURE: 1	CHECKED BY: / PROJ #:	A-50
	REVISION# -		

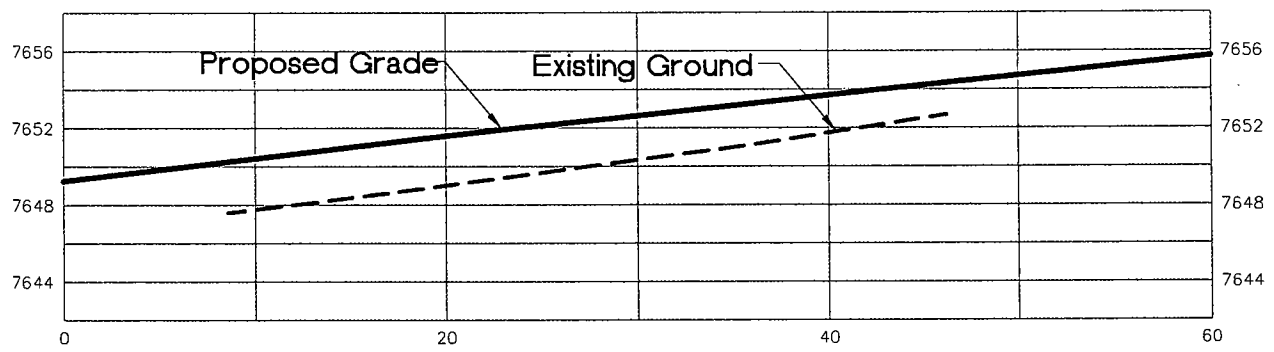
A-51: Wetland G-8 Grading Cross Sections

SCALE 1"=10ft

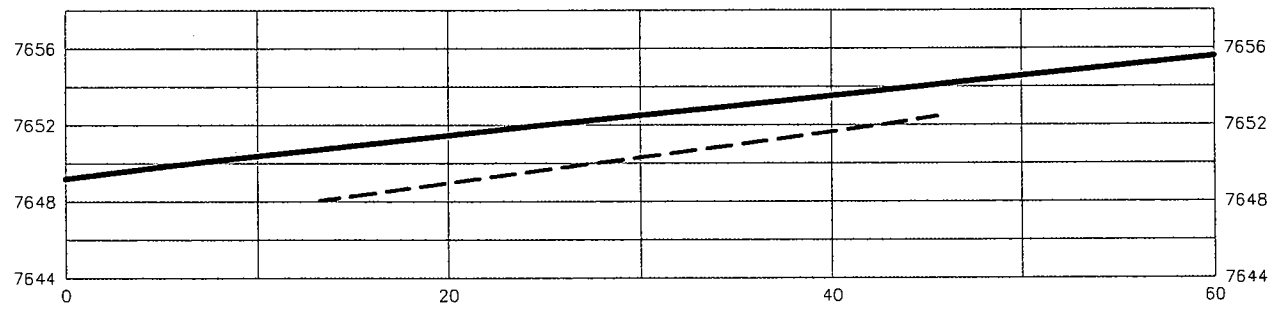
0+90



0+80



0+70



SCALE: 1" = 10ft	DRAWN BY: RAA	CHECKED BY: P.C.
PROJECT NUMBER: 140347	DATE: 5-29-02	FINAL APPROVAL: P.C.
LOCATION: Big Sky, Montana	FILENAME: GB-9-PLOT-LW.dwg	
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1
	REVISION# -	

LAND & WATER CONSULTING, INC.
P.O. BOX 6254
Missoula, MT 59807

MORRISON MAIERLE, Inc.
An Employee-Owned Company
PO Box 1113, 861 Technology Blvd, Bozeman, MT, 59771 - Phone: (406) 587-0721 Fax: (406) 587-1151

CLIENT: TMC

FIELD WORK: KIT
DRAWN BY: KW
CHECKED BY:

DATE: DATE
SCALE: AS-NOTED
PROJ #:

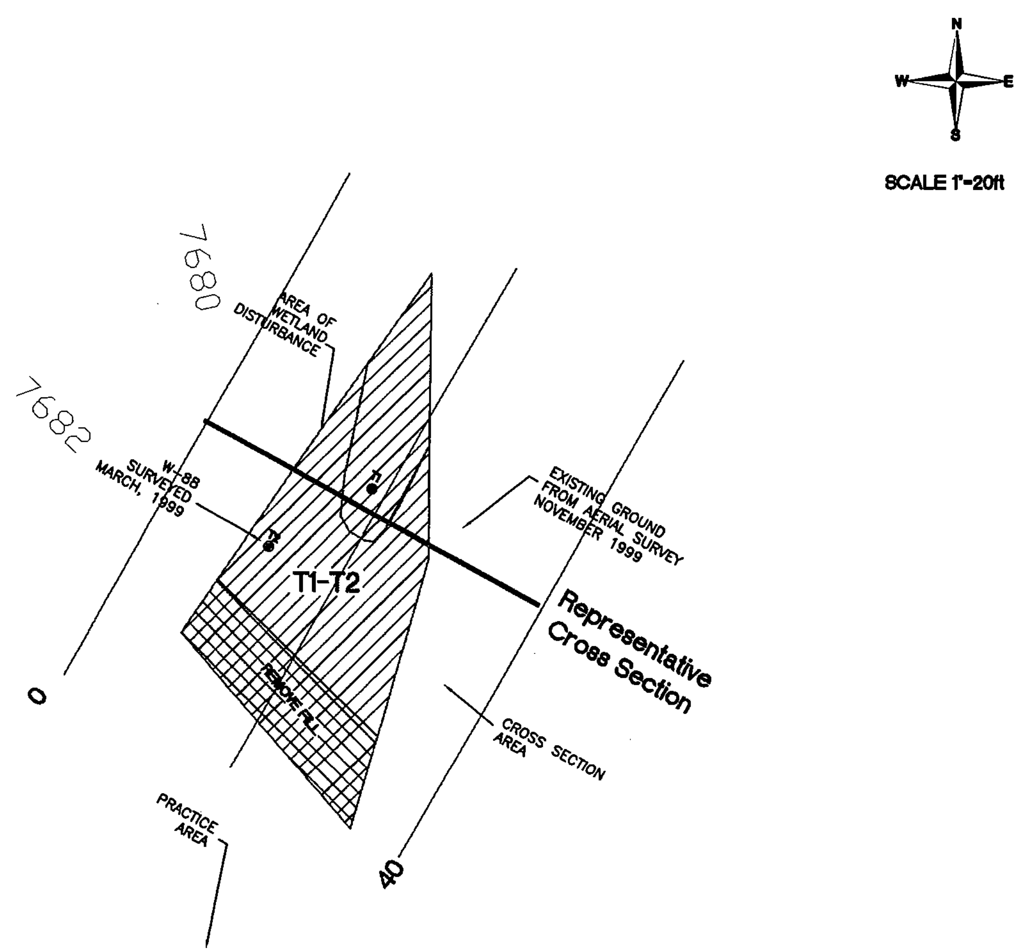
YMC
GOLF COURSE WETLAND RESTORATION PROJECT

PLOTTED DATE: Jun/08/2004
DRAWING NAME:
L:\140347 Golf Course\dwg\grading Plan\GB-9-PLOT-LW.dwg

A-51

SHEET 52 OF

A-53: Wetland G-9 Grading Plan



SCALE: 1" =20ft	DRAWN BY: NAA
PROJECT NUMBER: 140347	CHECKED BY: P.C.
LOCATION: Big Sky, Montana	DATE: 5-29-02
DESCRIPTION:	FINAL APPROVAL: P.C.
	FILENAME: G9-9-PLOT-LW.dwg
	SHEET: 1 of 1
	FIGURE: 1
	REVISION# -

LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

MORRISON MAIERLE, INC.
An Employee-Owned Company

CLIENT: TMC
FIELD WORK: KIT
DRAWN BY: KW
CHECKED BY:
DATE: DATE
SCALE: AS-NOTED
PROJ #:

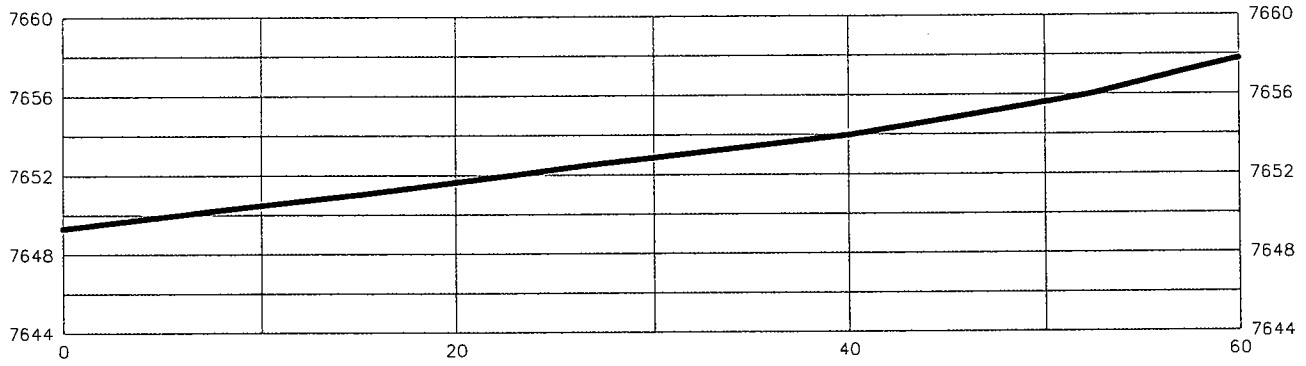
YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\
SHEET F2 OF
A-53

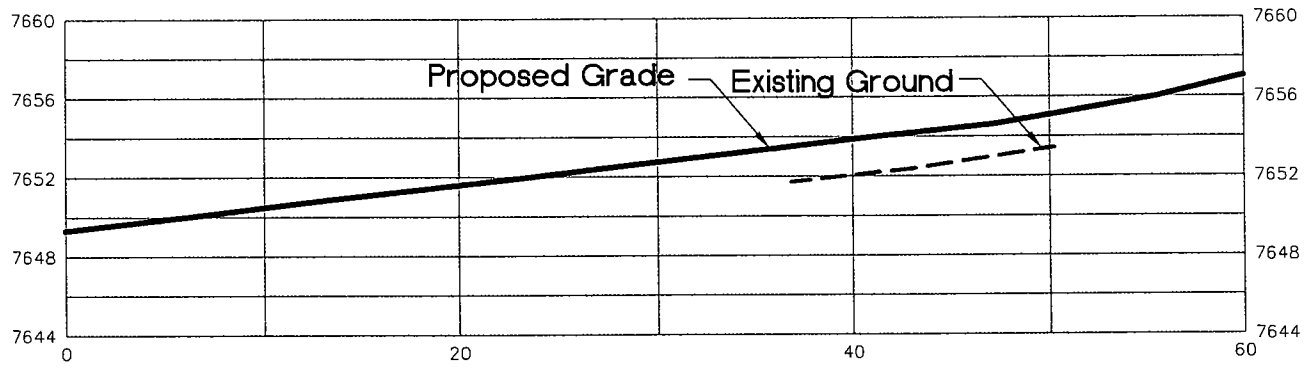
A-52: Wetland G-8 Grading Cross Sections

SCALE 1"=10ft

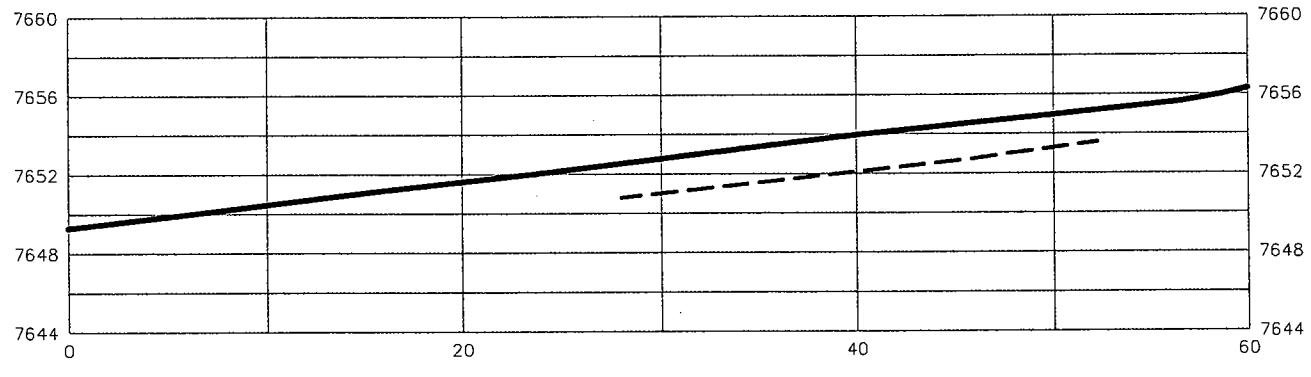
1+20



1+10



1+00



SCALE: 1" = 10ft	DRAWN BY: RAA	CHECKED BY: P.C.
PROJECT NUMBER: 140347	DATE: 5-29-02	FINAL APPROVAL: P.C.
LOCATION: Big Sky, Montana	FILENAME: GB-9-PLOT-LW.dwg	
DESCRIPTION:	SHEET: 1 of 1	FIGURE: 1
	REVISIONS# -	△

LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

MORRISON MAIERLE, Inc.
An Employee-Owned Company
PO Box 1113, 881 Technology Blvd, Bozeman, MT. 59771 - Phone (406) 587-0971 Fax (406) 587-1126

CLIENT: YMC

FIELD WORK: KW
DRAWN BY: KW
CHECKED BY:

DATE: DATE
SCALE: AS-NOTED
PROJ #:

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

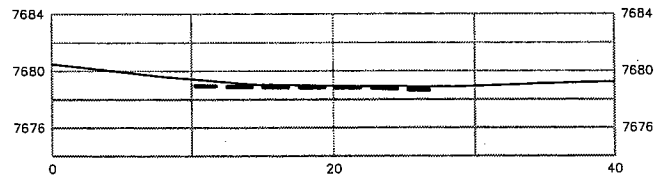
PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\GB-9-PLOT-LW.dwg
SHEET 52 OF

A-52

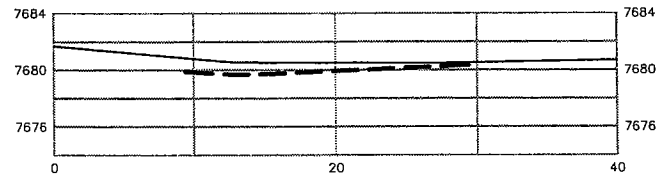
A-54: Wetland G-9 Grading Cross Sections

SCALE 1"=10ft

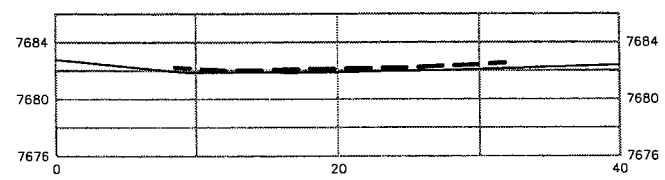
0+30



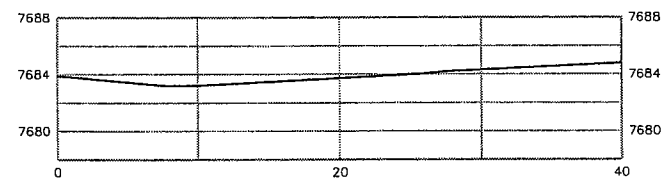
0+20



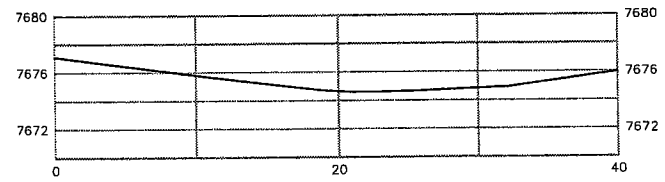
0+10



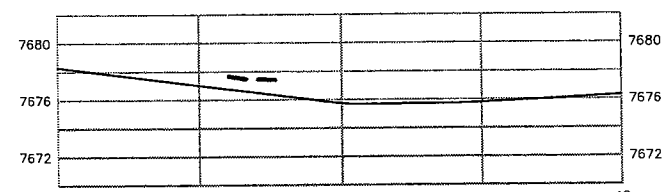
0+00



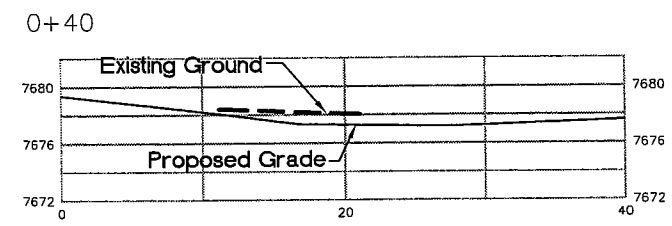
0+60



0+50



0+40



LAND & WATER CONSULTING, INC.
P.O. BOX 8994
Missoula, MT 59807

MORRISON MAIERLE, Inc.
An Stephen-Brandt Company

CLIENT: TMC

FIELD WORK: KIT
DRAWN BY: KW
CHECKED BY:

DATE: DATE
SCALE: AS-NOTED
PROJ #:

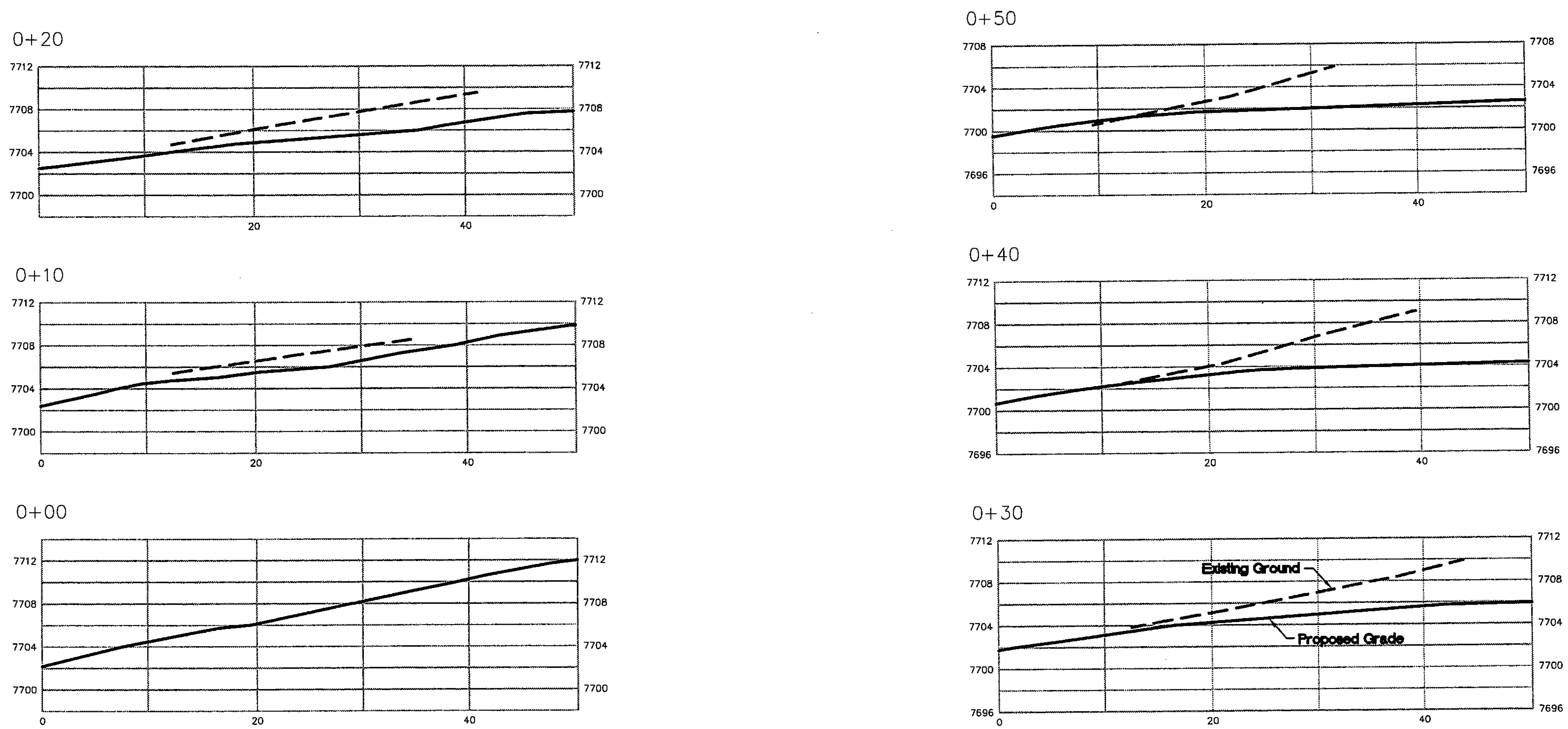
YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G9-PLOF-Util.dwg
SHEET F2 OF

A-54

Sheet A-67: Wetland G11 Grading Cross Sections

SCALE 1"=10ft



LAND & WATER CONSULTING, INC.
P.O. BOX 8254

MORRISON MAIERLE, INC.

CLIENT: CLIENT
FIELD WORK: KIT
DRAWN BY: KW
CHECKED BY:
DATE: 12/19/01
SCALE: NOTED
PROJ #3017.018

YMC
GOLF COURSE WETLAND
RESTORATION PROJECT

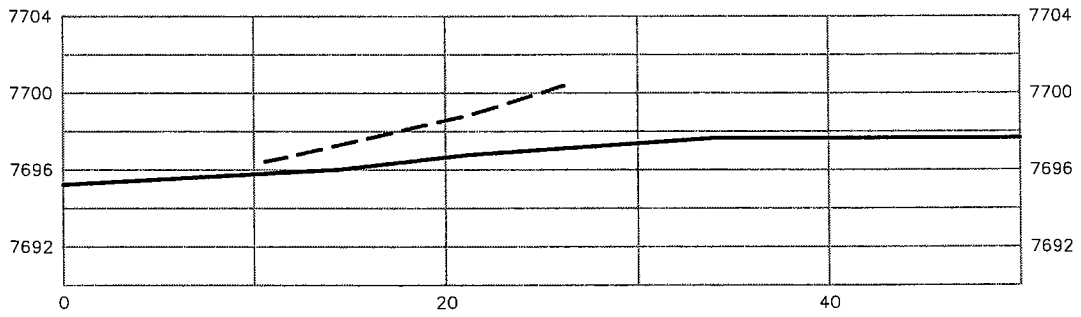
PLOTTED DATE: Jun/08/2004
DRAWING NAME:
SHEET A-67OF

A-67

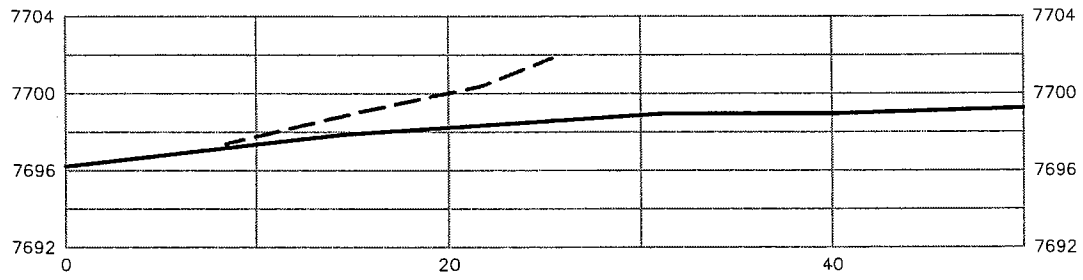
Sheet A-68: Wetland G11 Grading Cross Sections

SCALE 1"=10ft

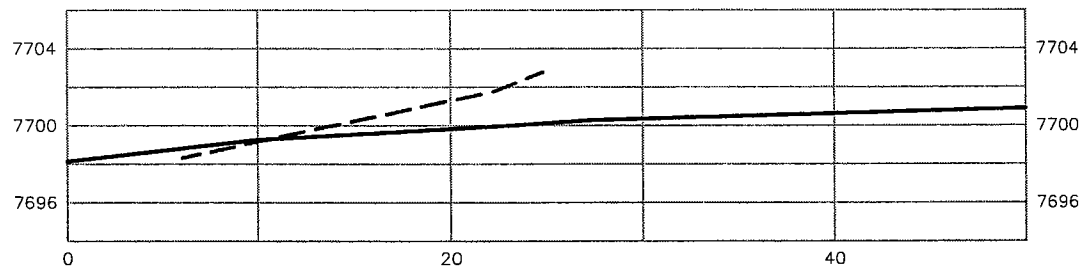
0+80



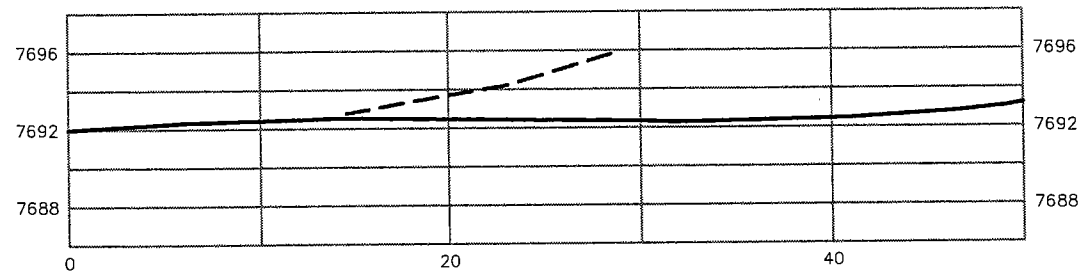
0+70



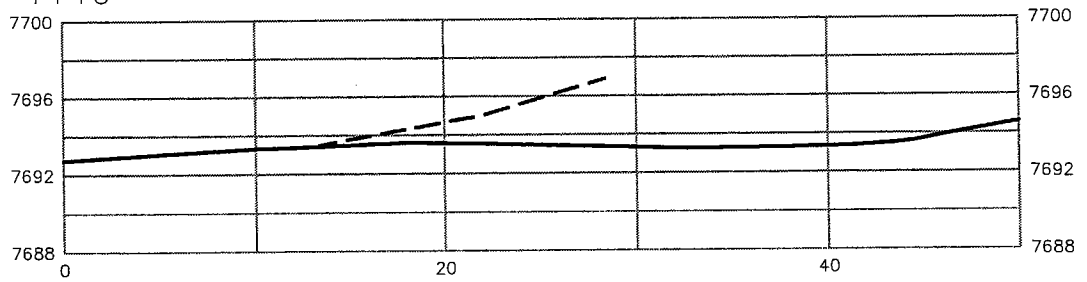
0+60



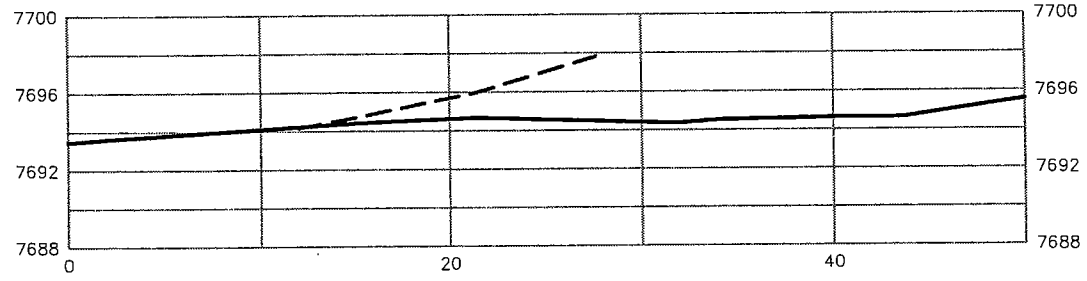
1+20



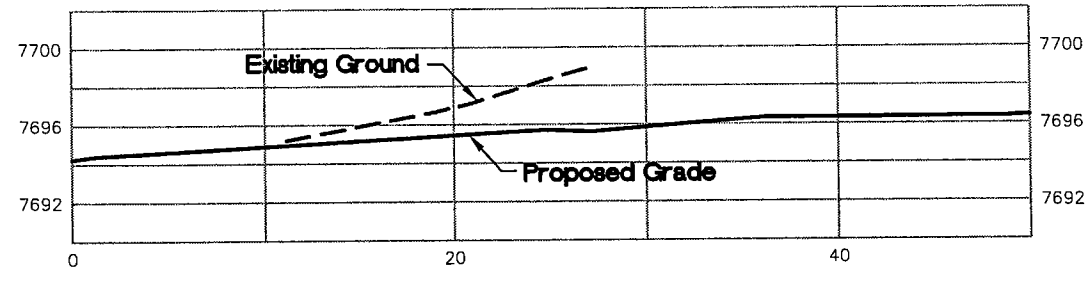
1+10



1+00



0+90



LAND & WATER CONSULTING, INC.
P.O. BOX 4984
Missoula, MT 59807

MORRISON MAIERLE, Inc.
An Anglian Water Company

CLIENT: CLIENT

FIELD WORK: KT
DRAWN BY: KW
CHECKED BY:

DATE: 12/19/01
SCALE: NOTED
PROJ #: 3017.018

YMC
GOLF COURSE WETLAND RESTORATION PROJECT

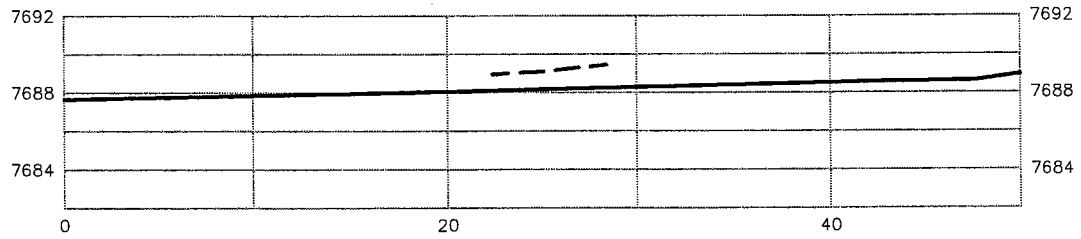
PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\14347 Golf Course\dwg\grading Plan\G11-72-PLOT-LW.dwg
SHEET: A-68

A-68

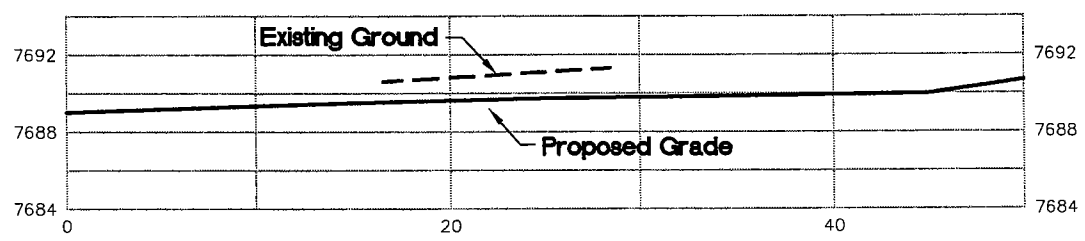
Sheet A-69: Wetland G11 Grading Cross Sections

SCALE 1"=10ft

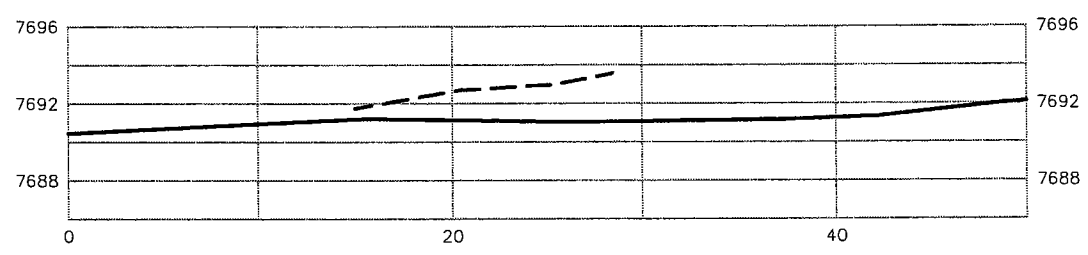
1+50



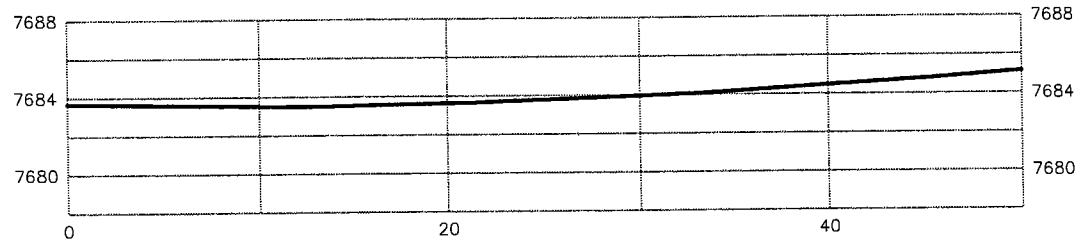
1+40



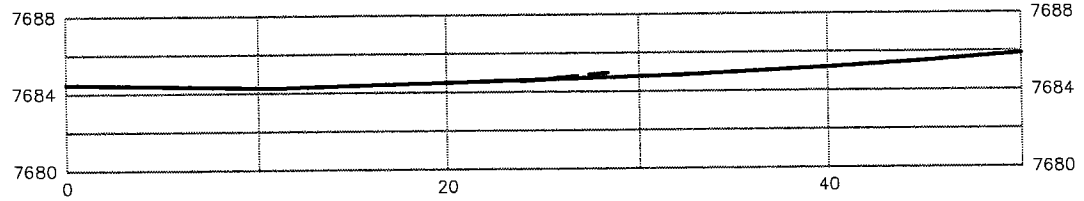
1+30



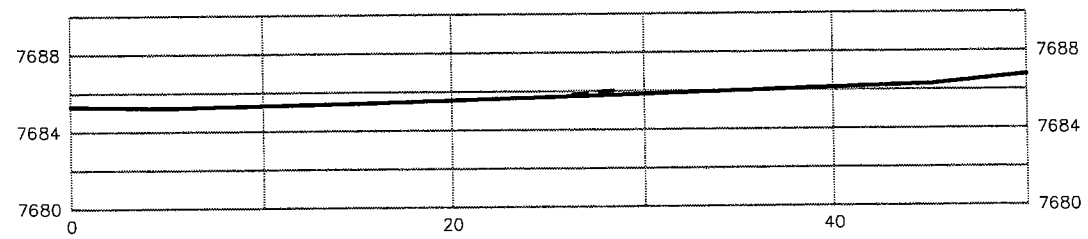
1+90



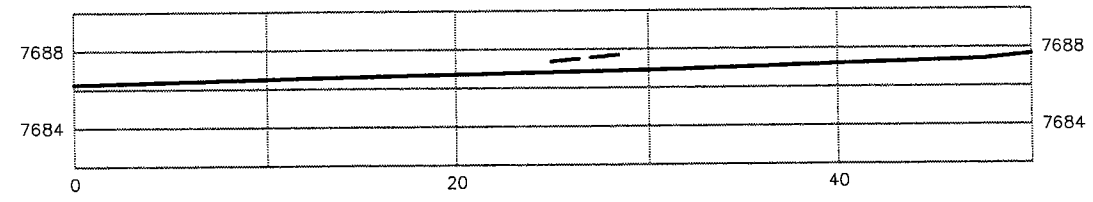
1+80



1+70



1+60



LAND & WATER CONSULTING, INC.
P.O. BOX 5894
Missoula, MT 59807

MORRISON MAIERLE, INC.

CLIENT: CLIENT

FIELD WORK: KIT
DRAWN BY: KW
CHECKED BY:

DATE: 12/19/01
SCALE: NOTED
PROJ #:3017.018

YMC
GOLF COURSE WETLAND RESTORATION PROJECT

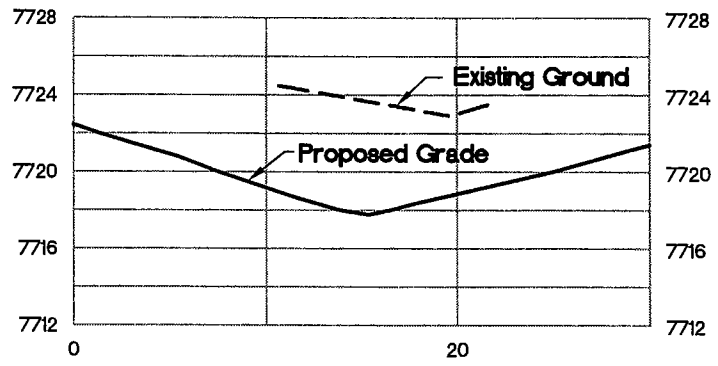
PLOTTED DATE: Jun/08/2004
DRAWING NAME: L:\140347 Golf Course\dwg\grading Plan\G11-12-RGP-LM.dwg
SHEET A-69 OF

A-69

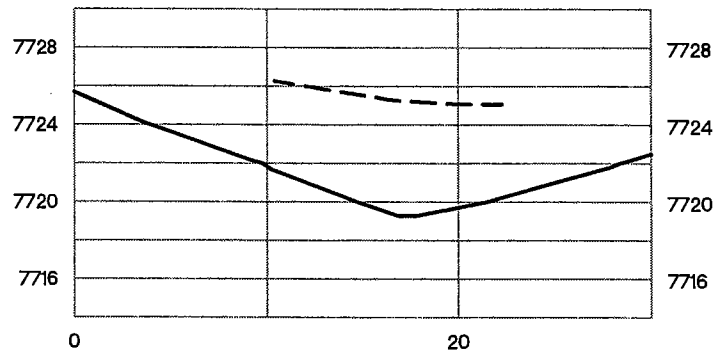
Sheet A-71: Wetland G12 Grading Cross Sections

SCALE 1"=10ft

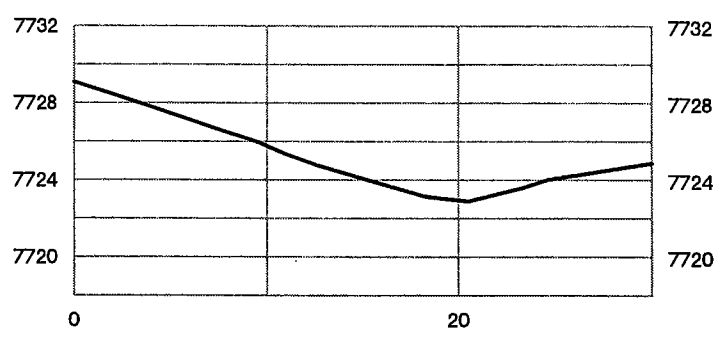
0+20



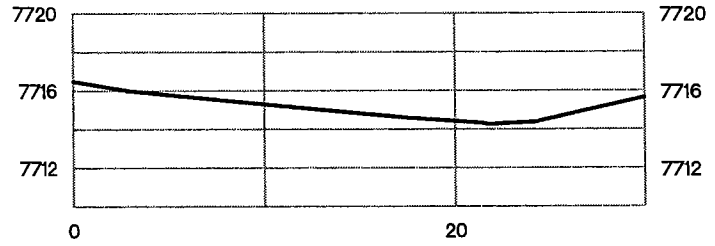
0+10



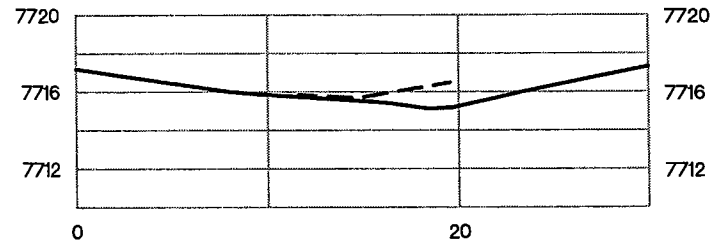
0+00



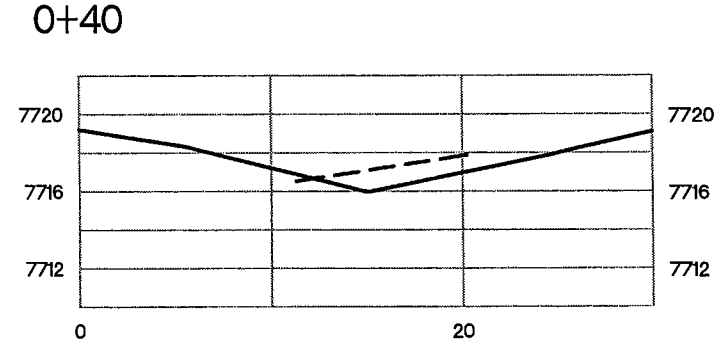
0+60



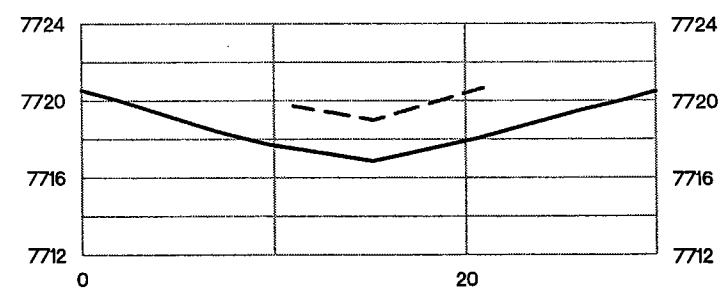
0+50



0+40



0+30



LAND & WATER CONSULTING, INC.
P.O. BOX 8954
Missoula, MT 59807

MORRISON MAIERLE, INC.
An Engineer-Led Company

CLIENT: CLIENT

FIELD WORK: KIT
DRAWN BY: KW
CHECKED BY:

DATE: 12/19/01
SCALE: NOTED
PROJ #: 3017.018

YMC
GOLF COURSE WETLAND RESTORATION PROJECT

PLOTTED DATE: Jun/08/2004
DRAWING NAME: A-71
SHEET A-71 OF

APPENDIX E

LAND & WATER

Appendix E

MONTANA NOXIOUS WEED LIST

Yellowstone Mountain Club Golf Course
Wetland Restoration Project

LAND & WATER

CATEGORY 1.
Category 1 noxious weeds are weeds that are currently established and generally widespread in many counties of the state. Management criteria includes awareness and education, containment, and suppression of existing infestations and prevention of new infestations. These weeds are capable of rapid spread and render land unfit or greatly limit beneficial uses.

1. Canada Thistle (*Cirsium arvense*)
2. Field Bindweed (*Convolvulus arvensis*)
3. Whitetop or Hoary Cress (*Cardaria draba*)
4. Leafy Spurge (*Euphorbia esula*)
5. Russian Knapweed (*Centaurea repens*)
6. Spotted Knapweed (*Centaurea maculosa*)
7. Diffuse Knapweed (*Centaurea diffusa*)
8. Dalmatian Toadflax (*Linaria dalmatica*)
9. St. John's Wort (*Hypericum perforatum*)
10. Sulfur (Erect) Cinquefoil (*Potentilla recta*)
11. Common Tansy (*Tanacetum vulgare*)
12. Ox-eye Daisy (*Chrysanthemum leucanthemum* L.)
13. Hound's-tongue (*Cynoglossum officinale* L.)

CATEGORY 2.
Category 2 noxious weeds have recently been introduced into the state or are rapidly spreading from their current infestation sites. These weeds are capable of rapid spread and invasion of lands, rendering lands unfit for beneficial uses. Management criteria includes awareness and education, monitoring and containment of known infestations and eradication where possible.

1. Dyer's Woad (*Isatis tinctoria*)
2. Purple Loosestrife or Lythrum (*Lythrum salicaria, L. virgatum*, and any hybrid crosses thereof)
3. Tansy Ragwort (*Senecio jacobaea L.*)
4. Meadow Hawkweed Complex (*Hieracium pratense, H. floribundum, H. piloselloides*)
5. Orange Hawkweed (*Hieracium aurantiacum L.*)
6. Tall Buttercup (*Ranunculus acris L.*)
7. Tamarisk [Saltcedar] (*Tamarix spp.*)

CATEGORY 3.
Category 3 noxious weeds have not been detected in the state or may be found only in small, scattered, localized infestations. Management criteria includes awareness and education, early detection and immediate action to eradicate infestations. These weeds are known pests in nearby states and are capable of rapid spread and render land unfit for beneficial uses.

1. Yellow Star-thistle (*Centaurea solstitialis*)
2. Common Crupina (*Crupina vulgaris*)
3. Rush Skeletonweed (*Chondrilla juncea*)

APPENDIX F

LAND & WATER

Appendix F

YMC Golf Course Well Monitoring Final Report for 2003

Yellowstone Mountain Club Golf Course
Wetland Restoration Project

LAND & WATER

December 12, 2003

Steve Brown
Garlington, Lohn, and Robinson
199 West Pine
P. O. Box 7909
Missoula, MT 59807

RE: YC Golf Course Well Monitoring Final Report For 2003

Dear Steve,

This report summarizes our current status for YC Golf Course monitoring well data collection and the results of monitoring to date.

WELL INSTALLATIONS

Monitoring wells have been installed at all but two sites. I have visited all installations and they are installed correctly. Two wetland areas proposed for restoration have not had wells installed (G5 & G12). Both sites have culverts and are still in use as road access for course construction. The depth of fill over these sites is 5-10 feet making monitoring well installation difficult. The wells would also interfere with traffic. Reference area RG5 is located immediately adjacent to G5 and is at almost the same elevation. These RG5 wells should adequately represent conditions at G5 for final design purposes.

The RG7 reference area has been changed to a more representative spot closer to G7. This new location is just south of G7 in wetland LW-219 instead of in wetland W-106. No wells were installed in RG2G3G4. It was determined that the adjacent site next to G4 was representative of the G3 site and so we have combined the reference area. The reference areas for G9 and G12 have been combined to yield a common reference area - RG8G9G10G12. A new map is attached illustrating the final configuration of all monitoring well locations.

MONITORING RESULTS

Attached is a table of well monitoring results listing the distance to groundwater below ground surface for each well and date data was collected. Over half of the wells have thirteen weeks of data and the remainder has eleven weeks. The last several weeks of monitoring have shown variable results due to frozen wells and snow drifts.

G1 – Water levels in most G1 wells have been shallower than those in the Reference area (RG1) suggesting wetland restoration should be successful. One well (G1-1) shows drier conditions than the reference area wells.

G2 - Water levels in most G2 wells have been shallower than those in the Reference area (RG2G3G4) suggesting wetland restoration should be successful. One well (G2-4) shows drier conditions than the other wells but still within the range of reference area wells.

G3NE - Water levels in most G3NE wells have been deeper (drier) than the reference area until the latest reading when most levels rose to levels similar to the reference site (RG2G3G4G13). G3NE wells will be monitored further during 2004 high ground water period to determine whether the restoration proposed is likely to be successful without additional topographic work.

G3SW - Water levels in most G3SW wells have been shallower than those in the Reference area (RG2G3G4) suggesting wetland restoration should be successful. One well (G3SW-4) shows drier conditions than the other wells but still within the range of reference area wells for most monitoring dates.

G4 - Water levels in most G4 wells have been shallower than those in the Reference area (RG2G3G4) suggesting wetland restoration should be successful.

G5 – No wells were installed at G5 but the adjacent RG5 site has similar conditions and monitoring wells suggest adequate water for wetland restoration.

G6 -Water levels at G6 suggest drier conditions than the reference area (RG6) for most weeks. The latest results show water levels in G6 wells at 1 foot in one well and dry in another compared with 0.2 to 2.6 for water depths at RG6. G6 wells will be monitored further during 2004 high ground water period to determine whether the restoration proposed is likely to be successful without additional topographic work.

G7- Water levels in most G7 wells have been shallower than those in the Reference area (RG7) suggesting wetland restoration should be successful.

G8- Wells at G8 have been dry throughout monitoring period. Wells in the reference area (RG8G9G10G12) have had water within 1 foot on most dates. Further evaluation is needed to determine whether adequate hydrologic patterns are present during the high ground water period to satisfy successful wetland restoration at G8 site.

G9 - Wells at G9 have been dry throughout most of the monitoring period. Wells in the reference area (RG8G9G10G12) have had water within 1 foot on most dates. Further evaluation is needed to determine whether adequate hydrologic patterns are present during the high ground water period to satisfy successful wetland restoration at G9 site.

G10 - Wells at G10 have been dry throughout most of the monitoring period. Wells in the reference area (RG8G9G10G12) have had water within 1 foot on most dates. Further evaluation is needed to determine whether adequate hydrologic patterns are present during the high ground water period to satisfy successful wetland restoration at G10 site.

G11- Water levels in most G11 wells have been shallower than those in the Reference area (RG1) suggesting wetland restoration should be successful. One well (G11-1) shows slightly drier conditions than the reference area wells until the last week when it shows similar conditions.

SUMMARY

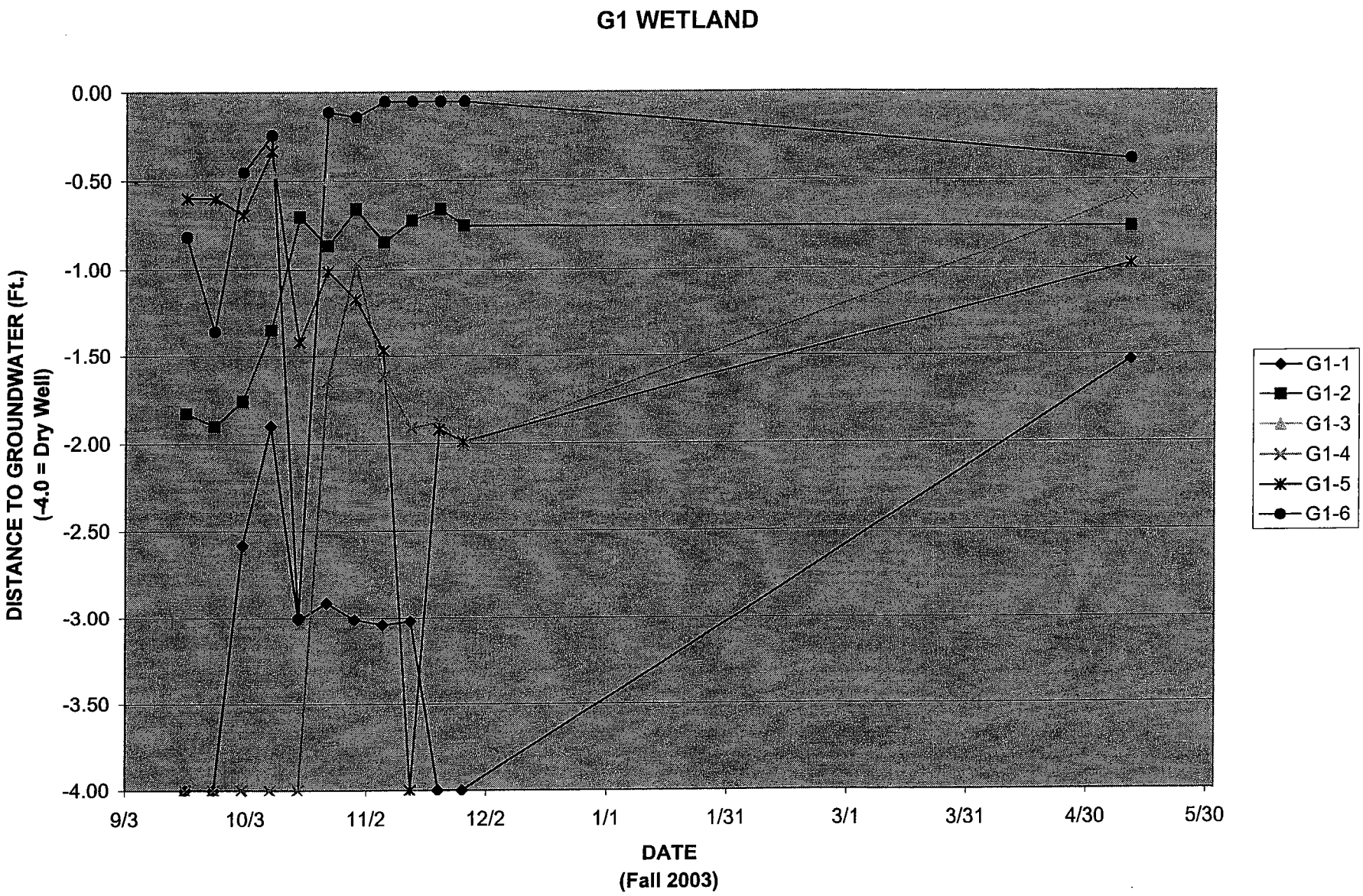
Groundwater data collected to date suggest that most restoration sites on the golf course appear to have adequate groundwater to support wetland restoration across most of each site. Four sites (G6, G8, G9, G10) appear to have significantly deeper groundwater than their reference sites. These data do not mean conclusively that wetland restoration is prohibitive at these four sites. We need to further evaluate conditions during the spring period of highest groundwater levels. The hydrologic information may suggest moderate changes in the plan for topographic adjustments and vegetation specifications to better match hydrologic patterns. In addition this new information may mean that some sites will benefit from topographic changes that were not initially considered. Please contact me if you have questions regarding these data.

Sincerely,

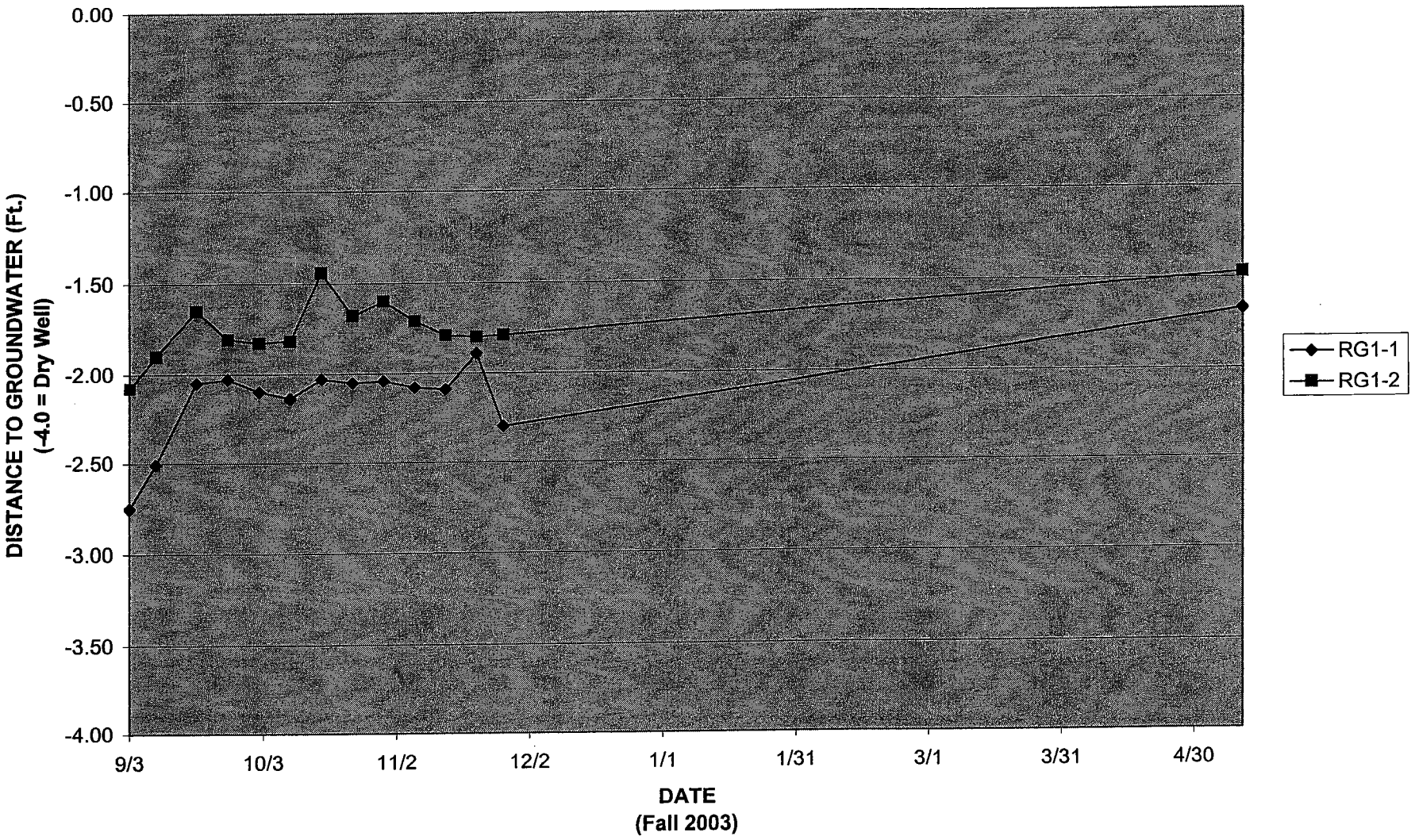
Barry Dutton
Certified Professional Soil Scientist

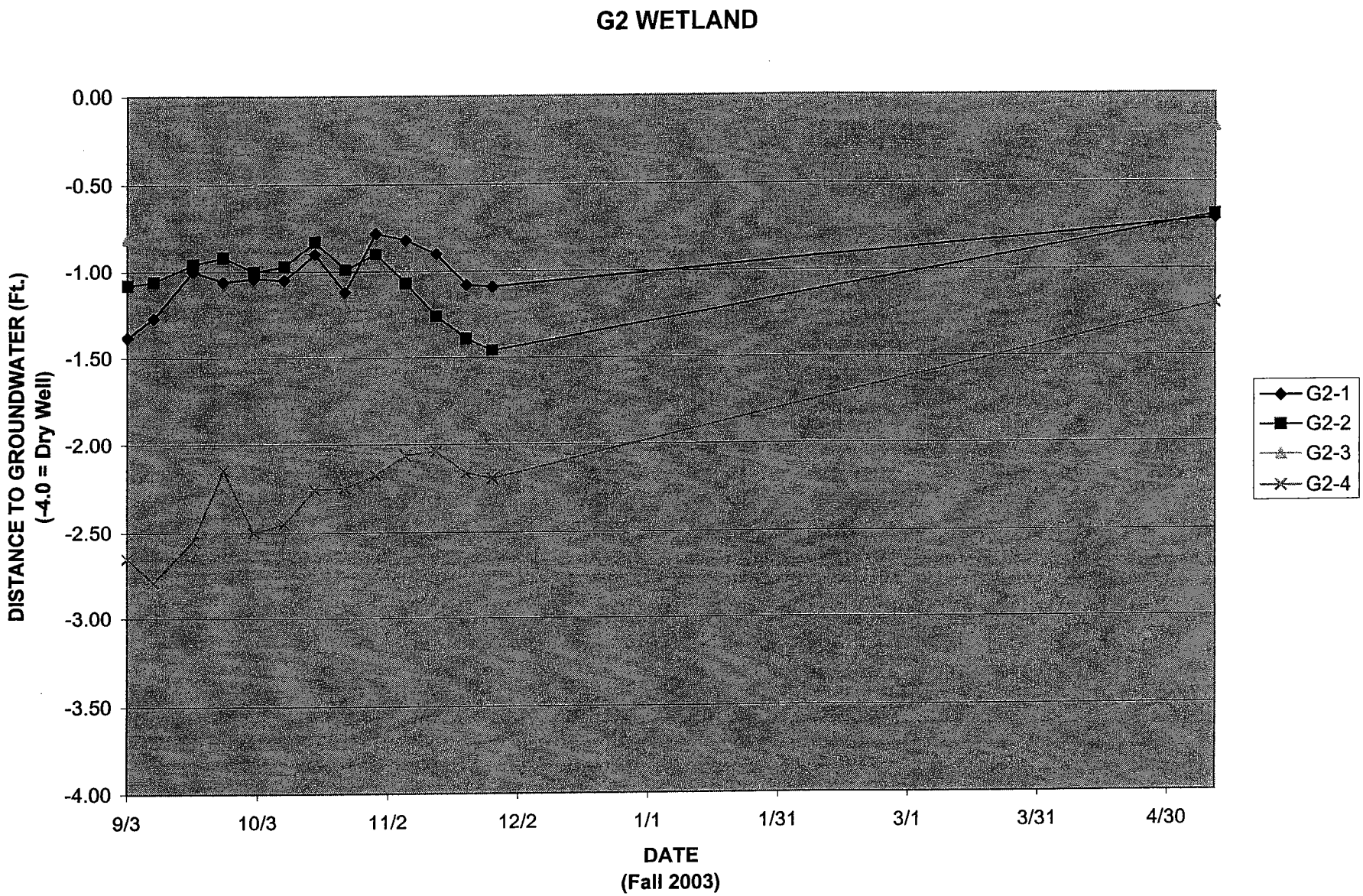
Enclosures

LAND & WATER

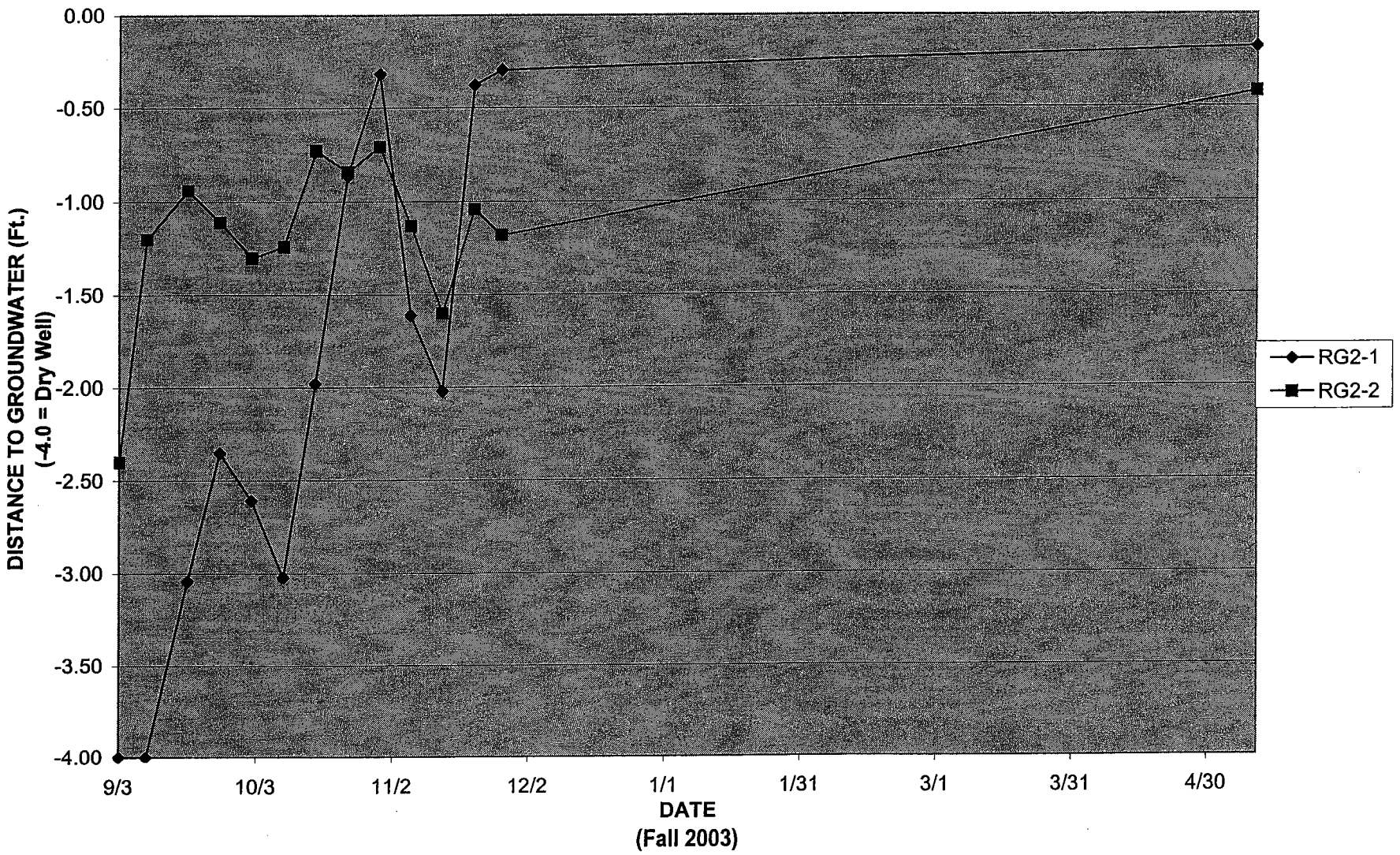

G1 WETLAND
DISTANCE TO GROUNDWATER (Ft.)
(-4.0 = Dry Well)
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
9/3
10/3
11/2
12/2
1/1
1/31
3/1
3/31
4/30
5/30
DATE
(Fall 2003)
G1-1
G1-2
G1-3
G1-4
G1-5
G1-6

R G1 WETLAND

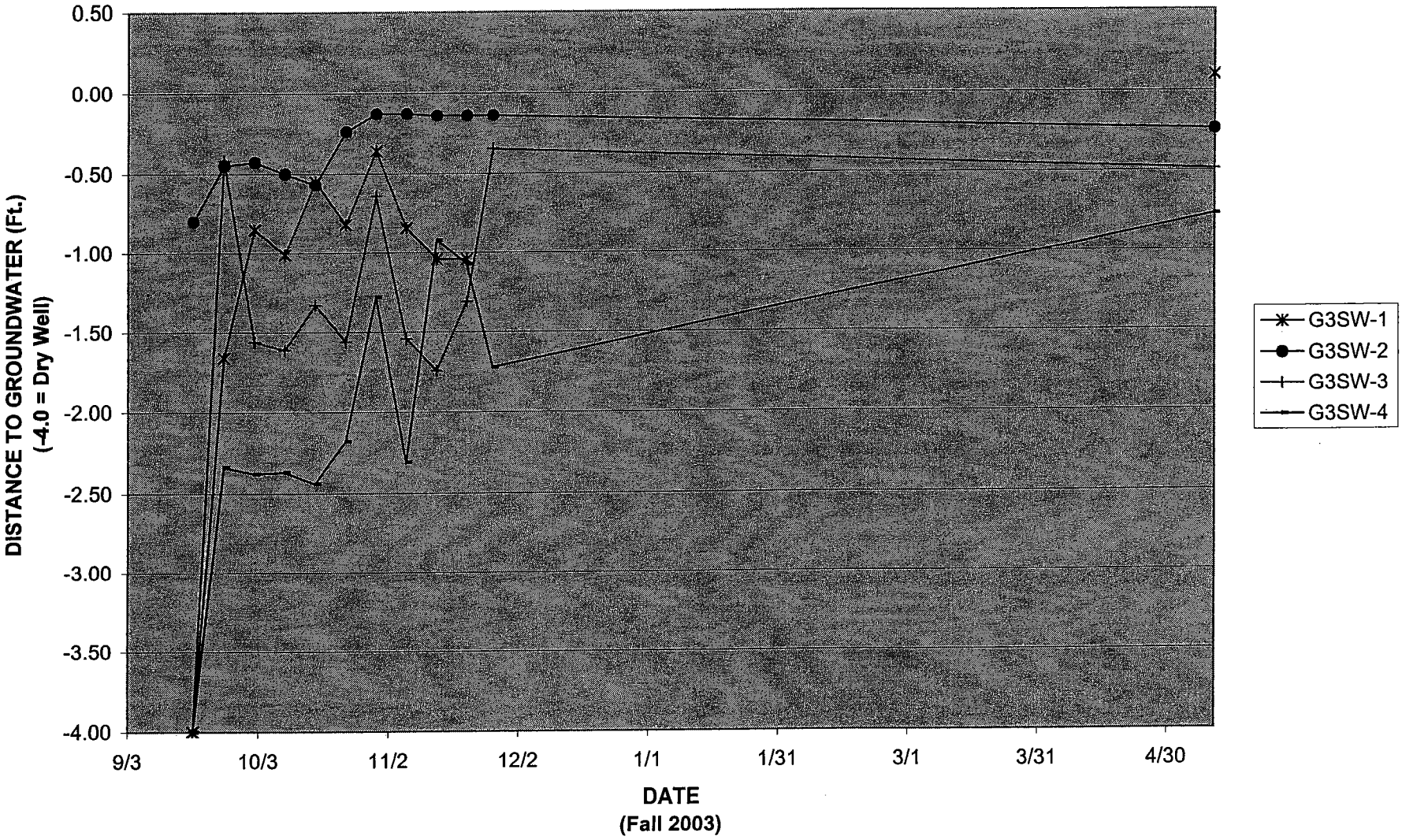

0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
DISTANCE TO GROUNDWATER (Ft.)
(-4.0 = Dry Well)
9/3
10/3
11/2
12/2
1/1
1/31
3/1
3/31
4/30
DATE
(Fall 2003)
RG1-1
RG1-2


G2 WETLAND
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
DISTANCE TO GROUNDWATER (Ft.)
(-4.0 = Dry Well)
9/3
10/3
11/2
12/2
1/1
1/31
3/1
3/31
4/30
DATE
(Fall 2003)
G2-1
G2-2
G2-3
G2-4

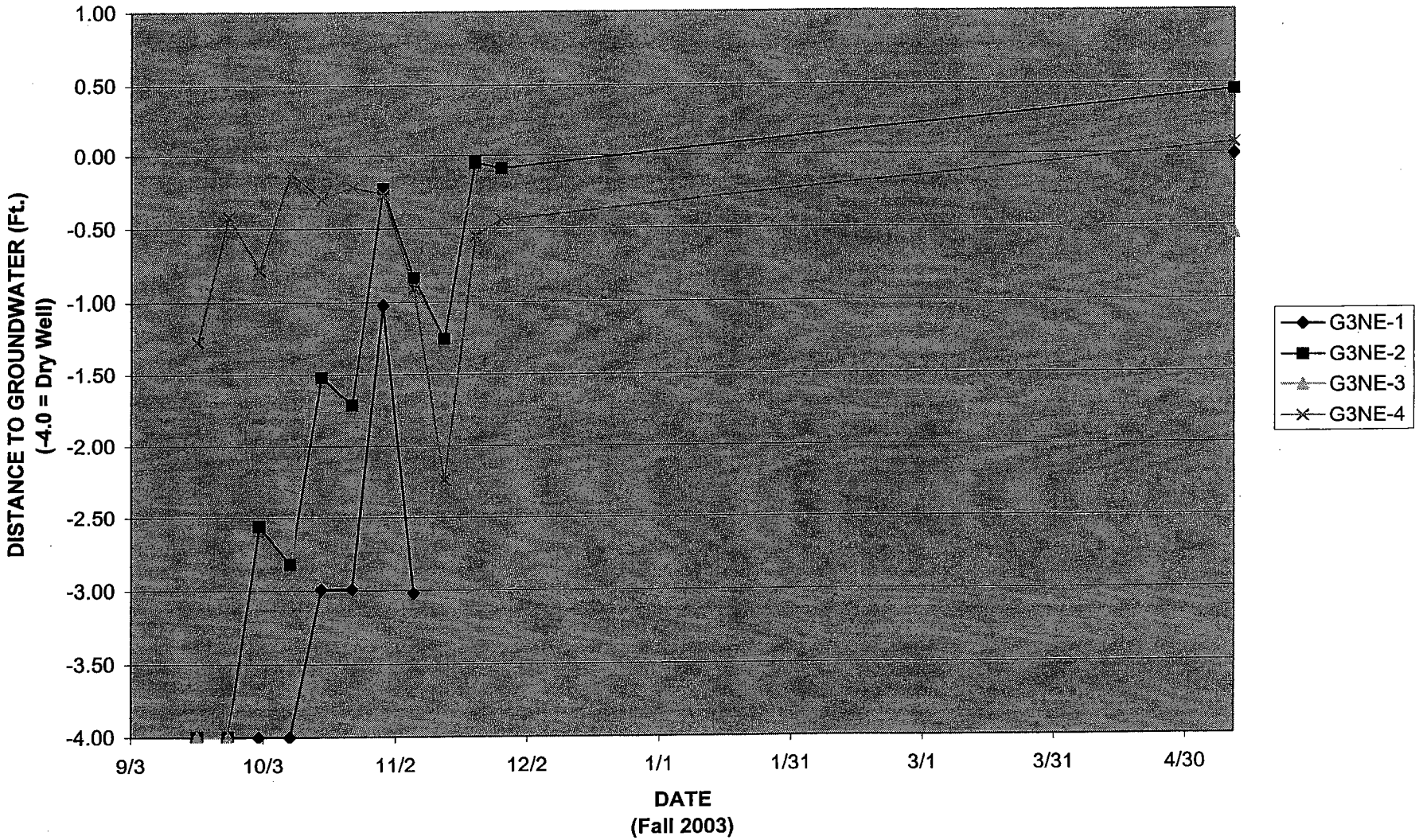
R G2 G3 G4 G13 WETLAND

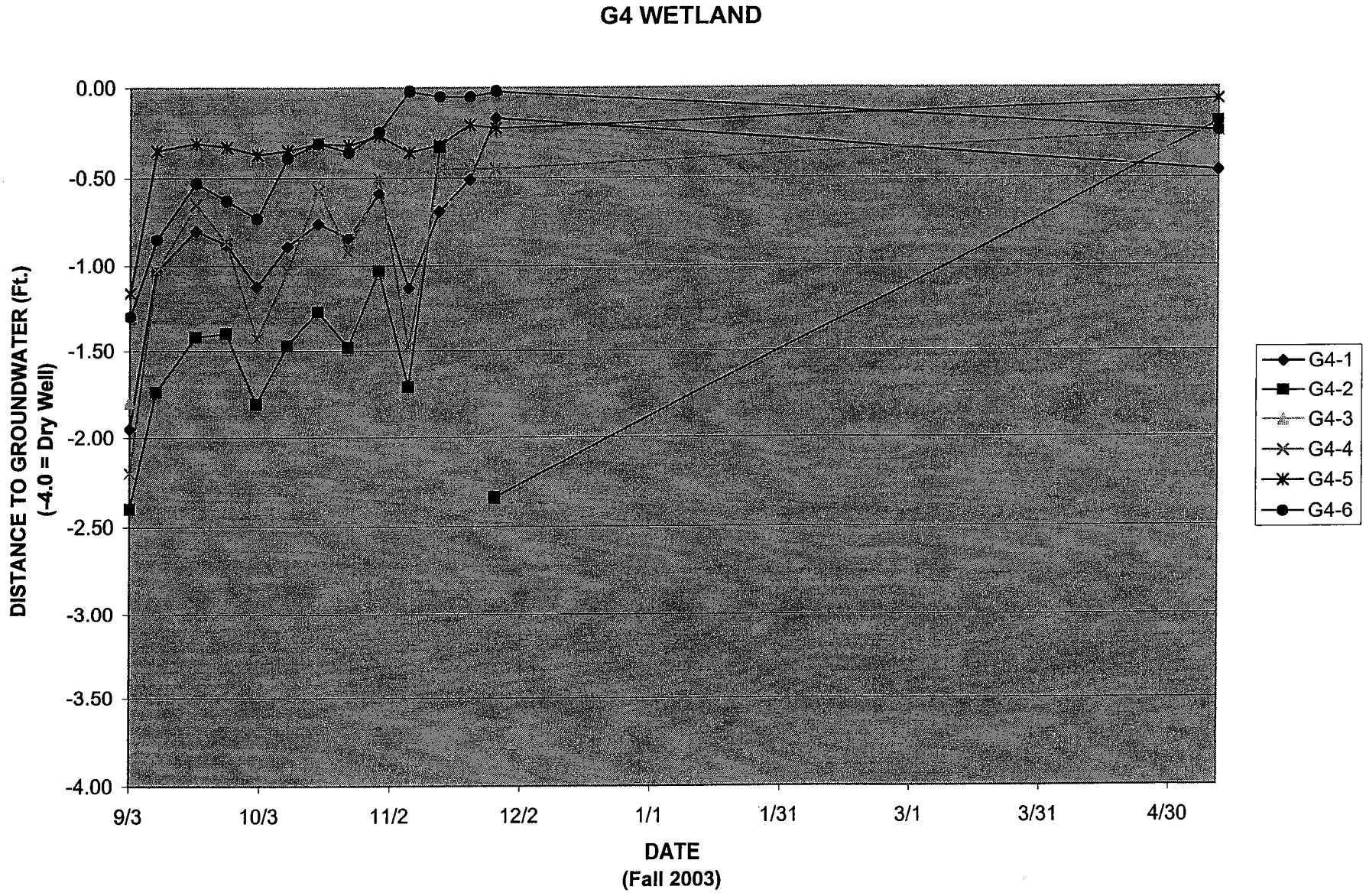


G3SW WETLANDS

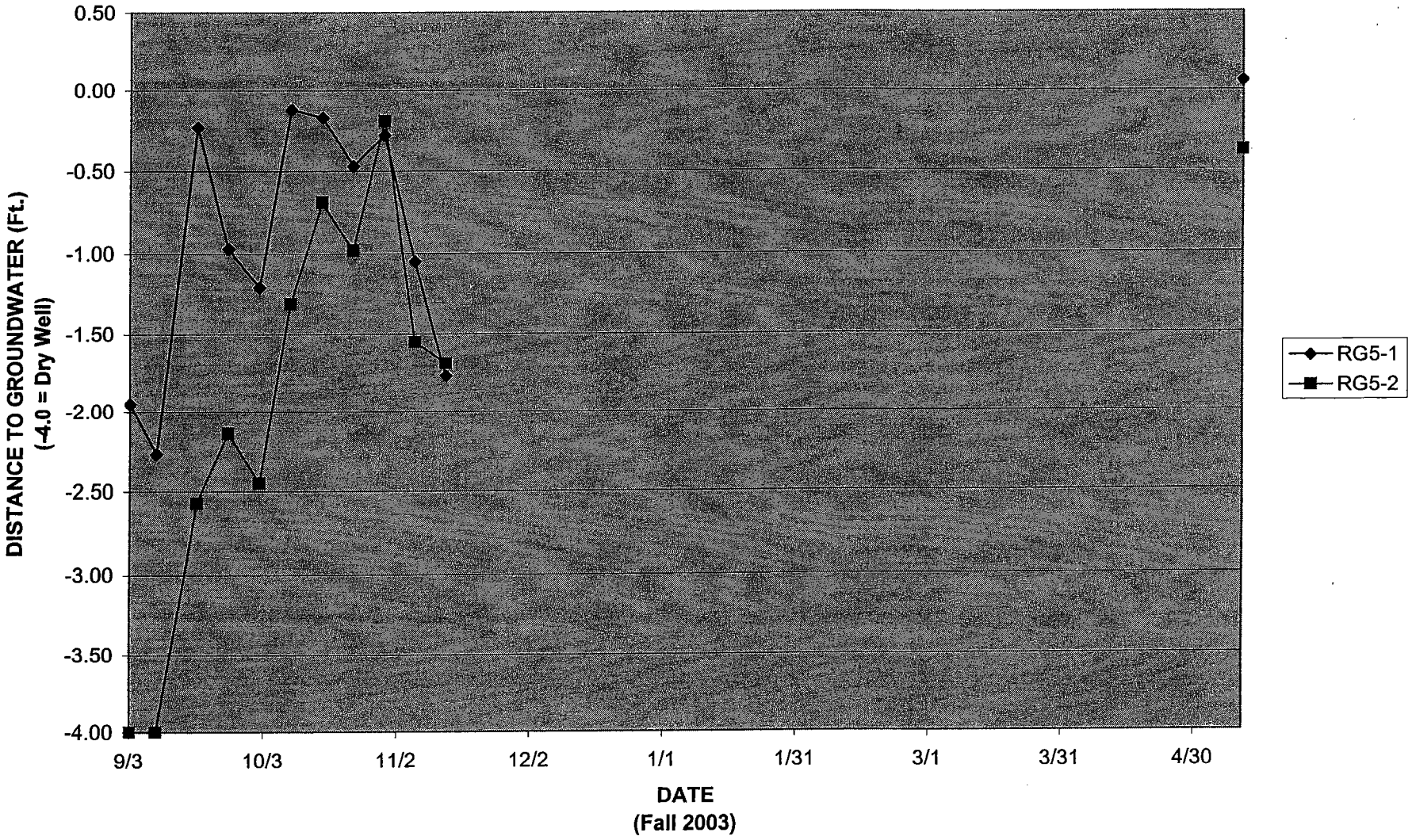


G3NE WETLANDS

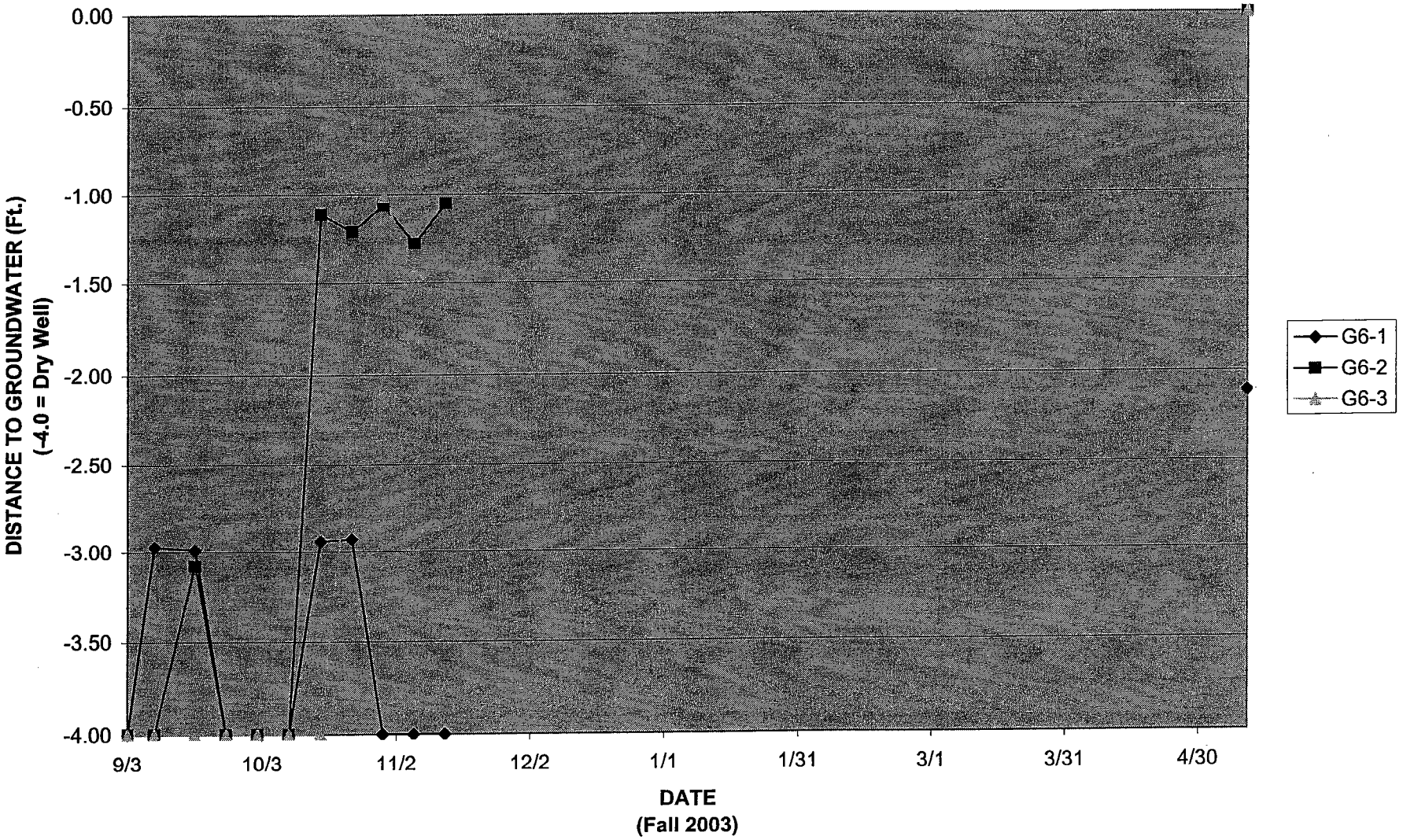


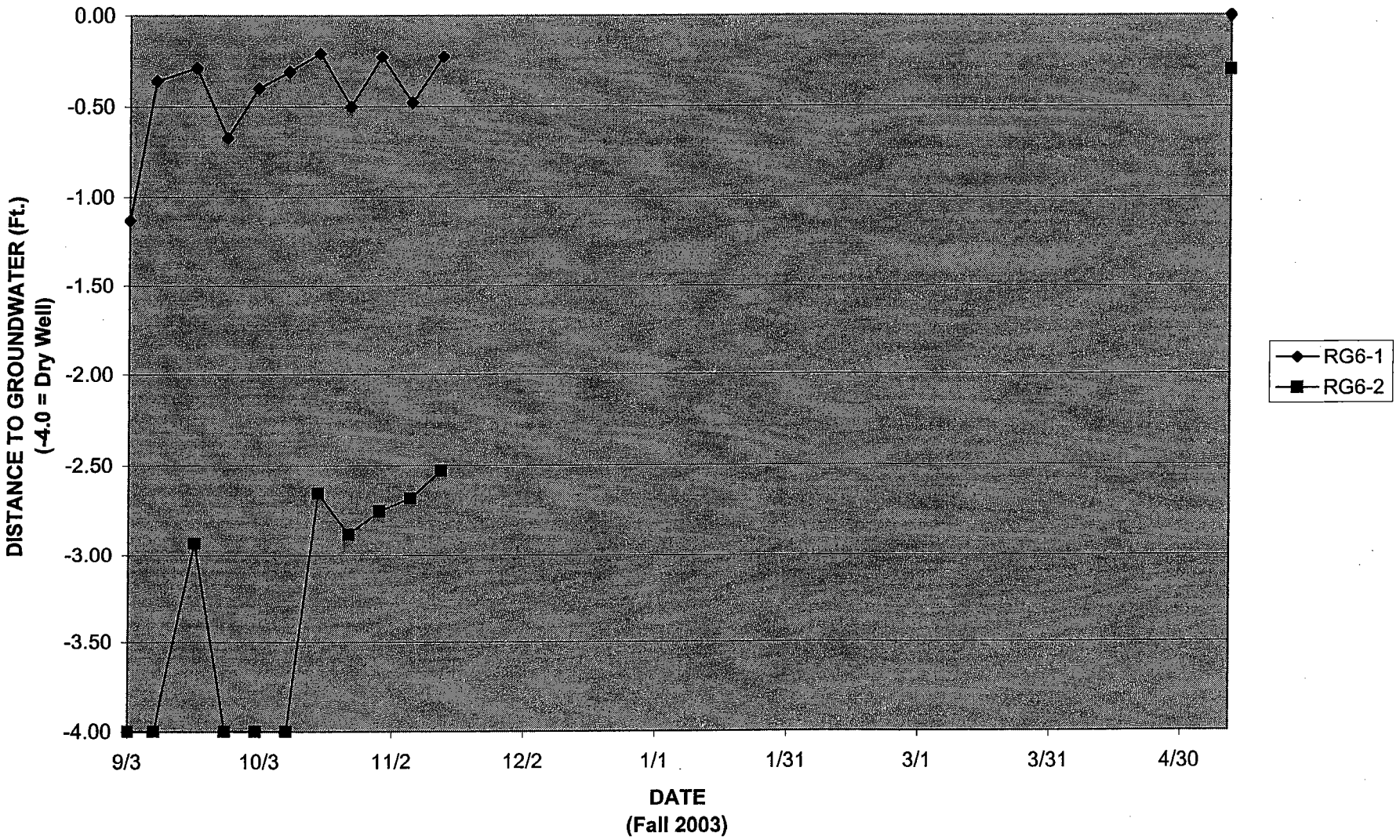

G4 WETLAND
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
DISTANCE TO GROUNDWATER (Ft.)
(-4.0 = Dry Well)
9/3
10/3
11/2
12/2
1/1
1/31
3/1
3/31
4/30
DATE
(Fall 2003)
G4-1
G4-2
G4-3
G4-4
G4-5
G4-6

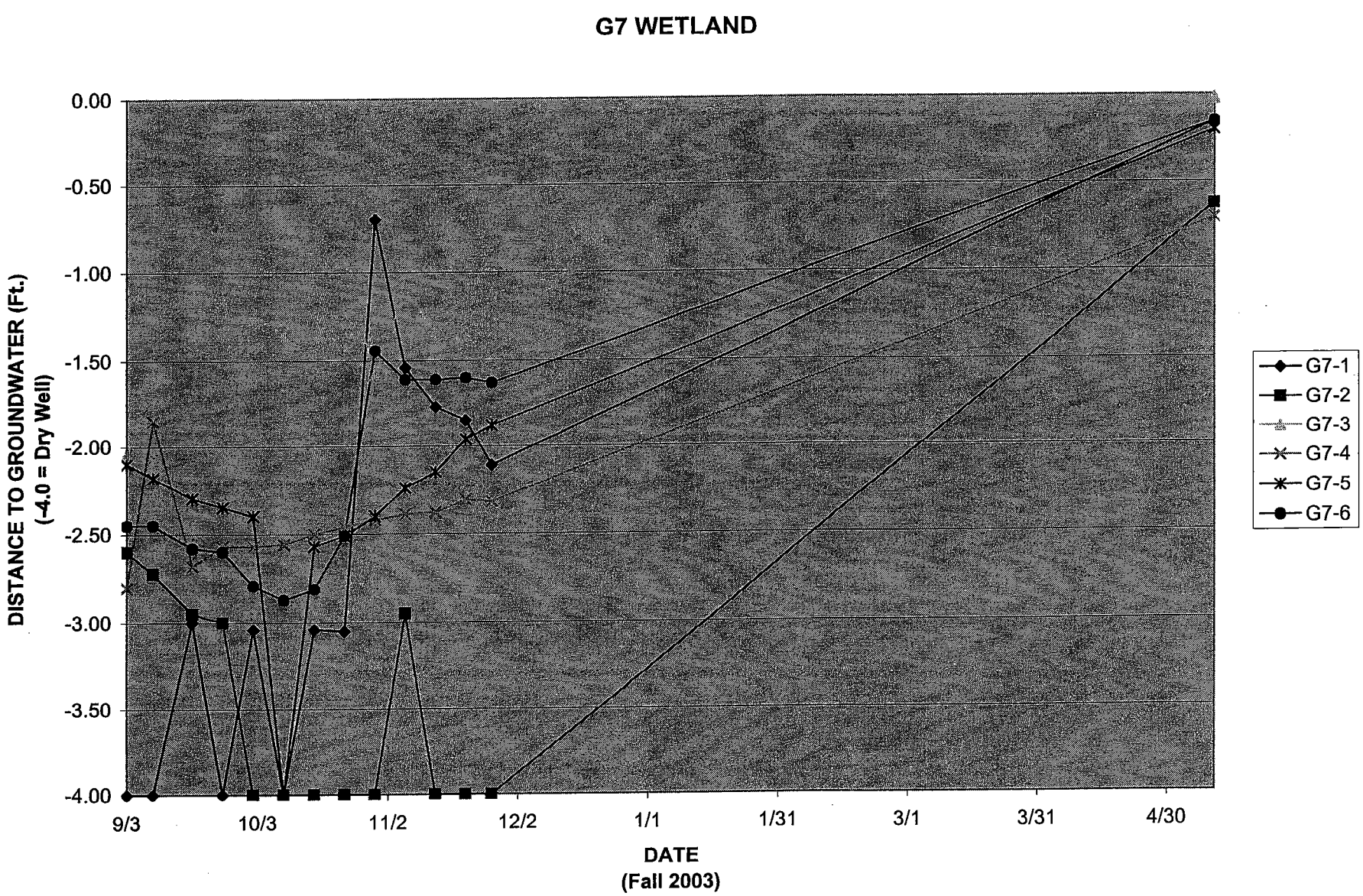
R G5 WETLAND

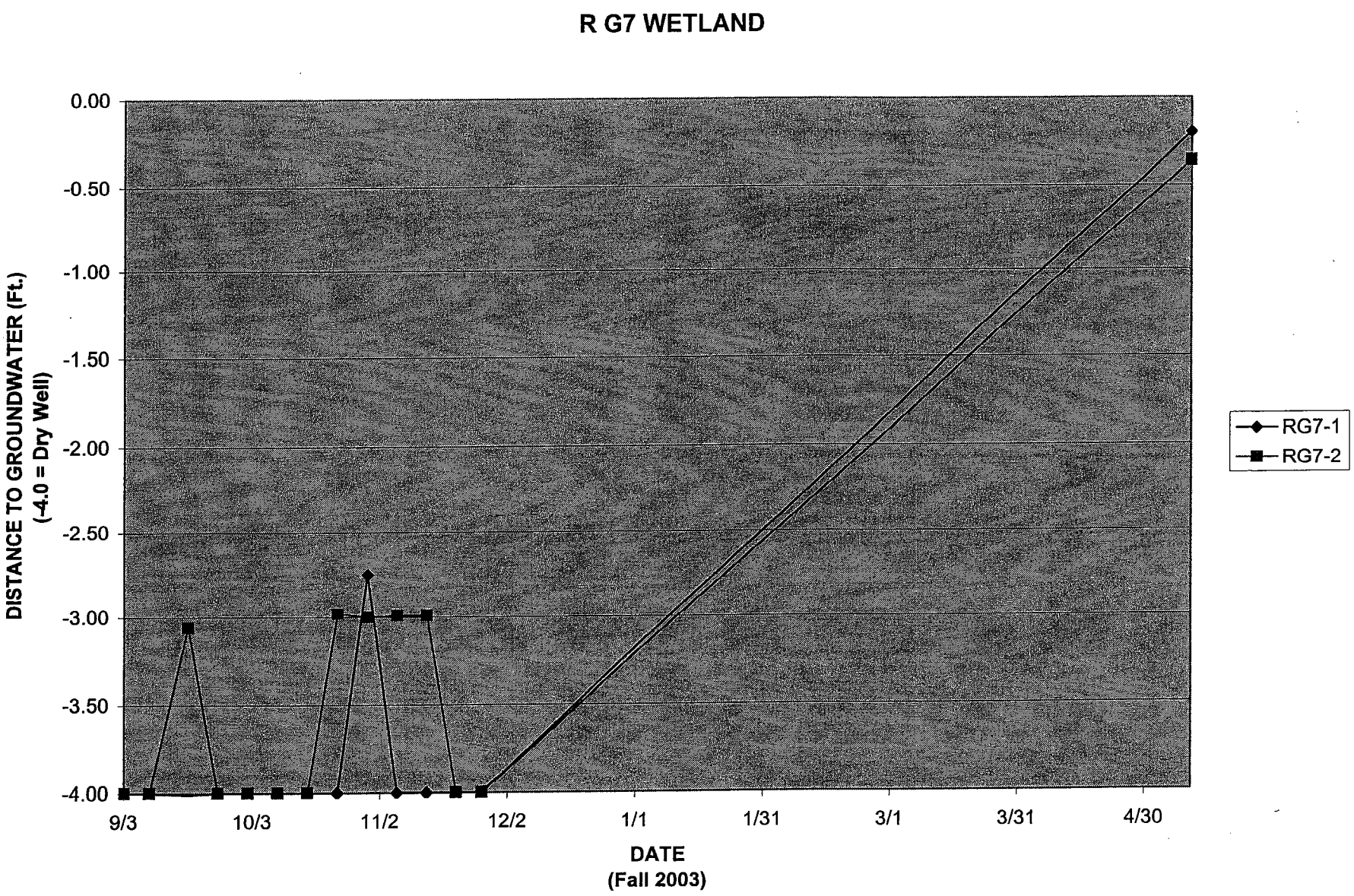

0.50
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
DISTANCE TO GROUNDWATER (Ft.)
(-4.0 = Dry Well)
9/3
10/3
11/2
12/2
1/1
1/31
3/1
3/31
4/30
DATE
(Fall 2003)
RG5-1
RG5-2

G6 WETLAND

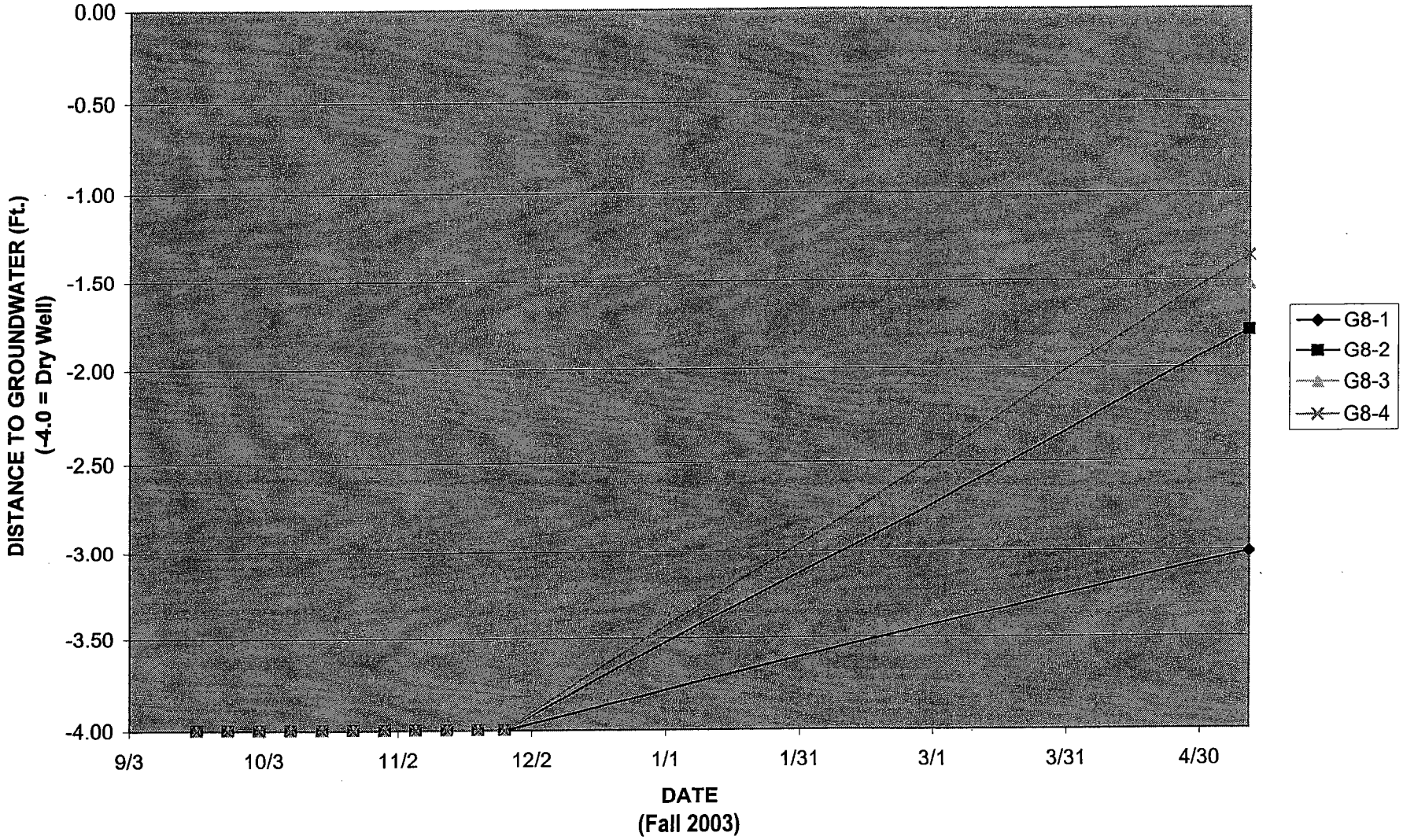

0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
DISTANCE TO GROUNDWATER (Ft.)
(-4.0 = Dry Well)
9/3
10/3
11/2
12/2
1/1
1/31
3/1
3/31
4/30
DATE
(Fall 2003)
G6-1
G6-2
G6-3


R G6 WETLAND
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
DISTANCE TO GROUNDWATER (Ft.)
(-4.0 = Dry Well)
9/3
10/3
11/2
12/2
1/1
1/31
3/1
3/31
4/30
DATE
(Fall 2003)
RG6-1
RG6-2

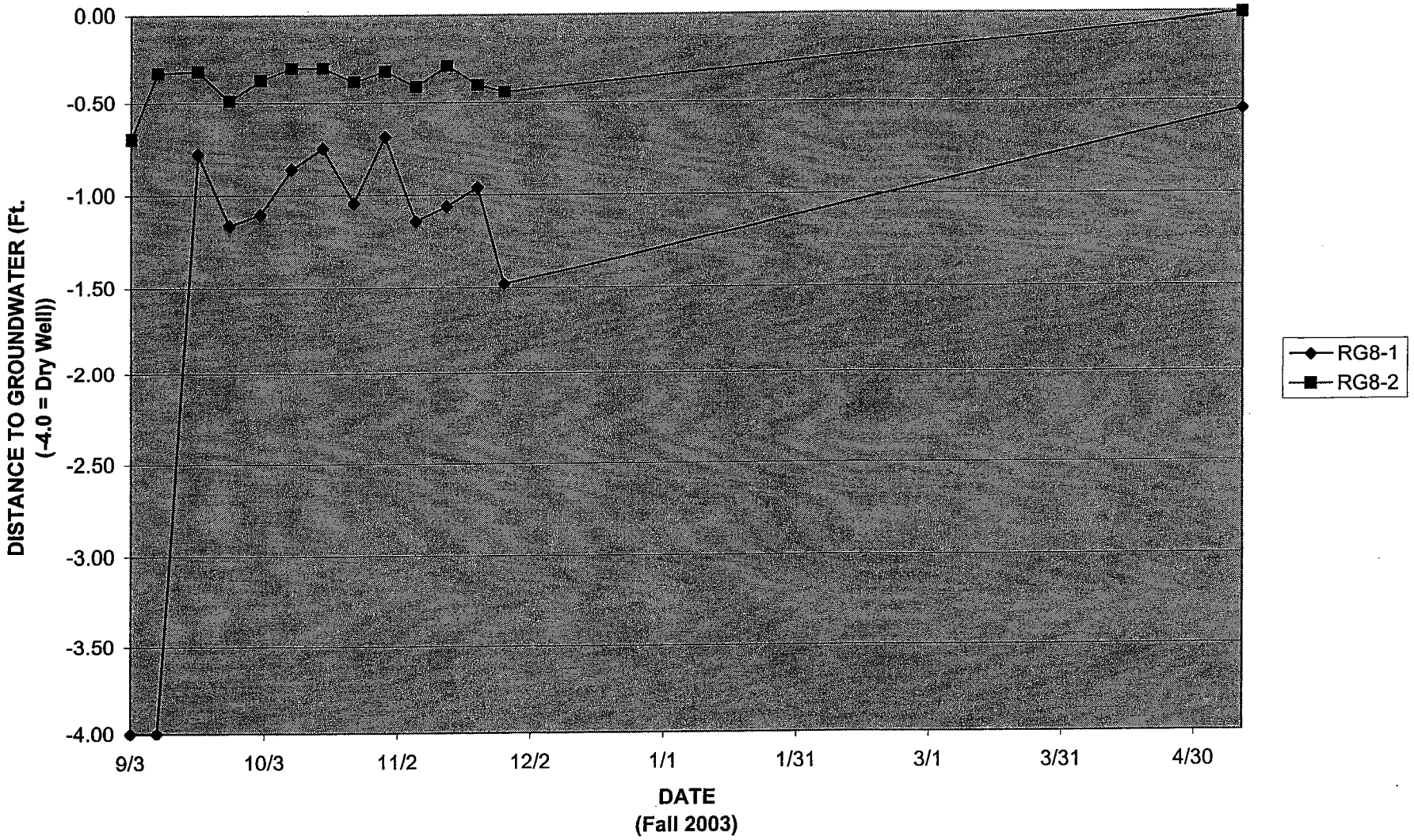

G7 WETLAND
DISTANCE TO GROUNDWATER (Ft.)
(-4.0 = Dry Well)
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
9/3
10/3
11/2
12/2
1/1
1/31
3/1
3/31
4/30
DATE
(Fall 2003)
G7-1
G7-2
G7-3
G7-4
G7-5
G7-6


R G7 WETLAND
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
DISTANCE TO GROUNDWATER (Ft.)
(-4.0 = Dry Well)
9/3
10/3
11/2
12/2
1/1
1/31
3/1
3/31
4/30
DATE
(Fall 2003)
RG7-1
RG7-2

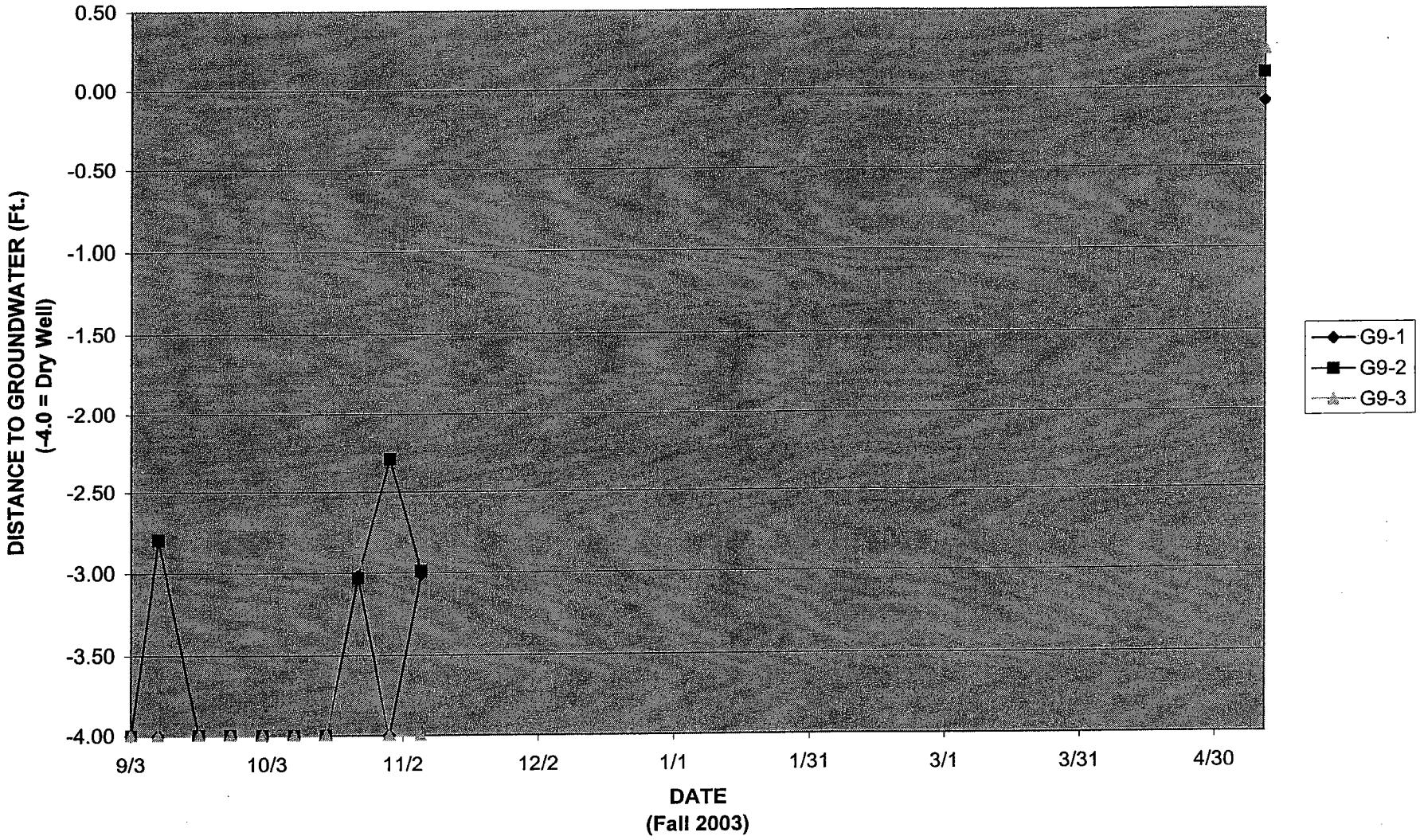
G8 WETLAND


0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
DISTANCE TO GROUNDWATER (Ft.)
(-4.0 = Dry Well)
9/3
10/3
11/2
12/2
1/1
1/31
3/1
3/31
4/30
DATE
(Fall 2003)
G8-1
G8-2
G8-3
G8-4

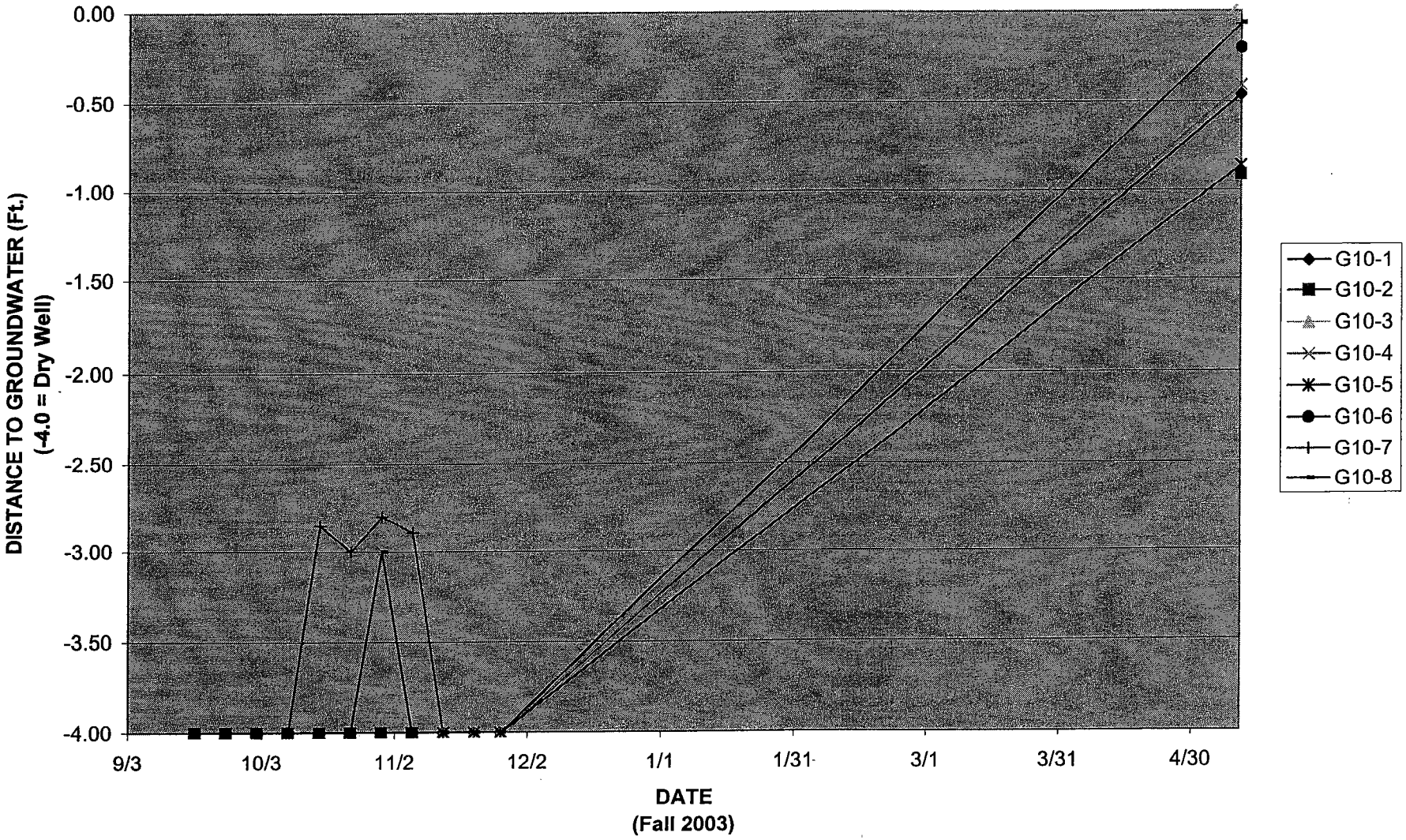
R G8 G9 G10 G12 WETLAND



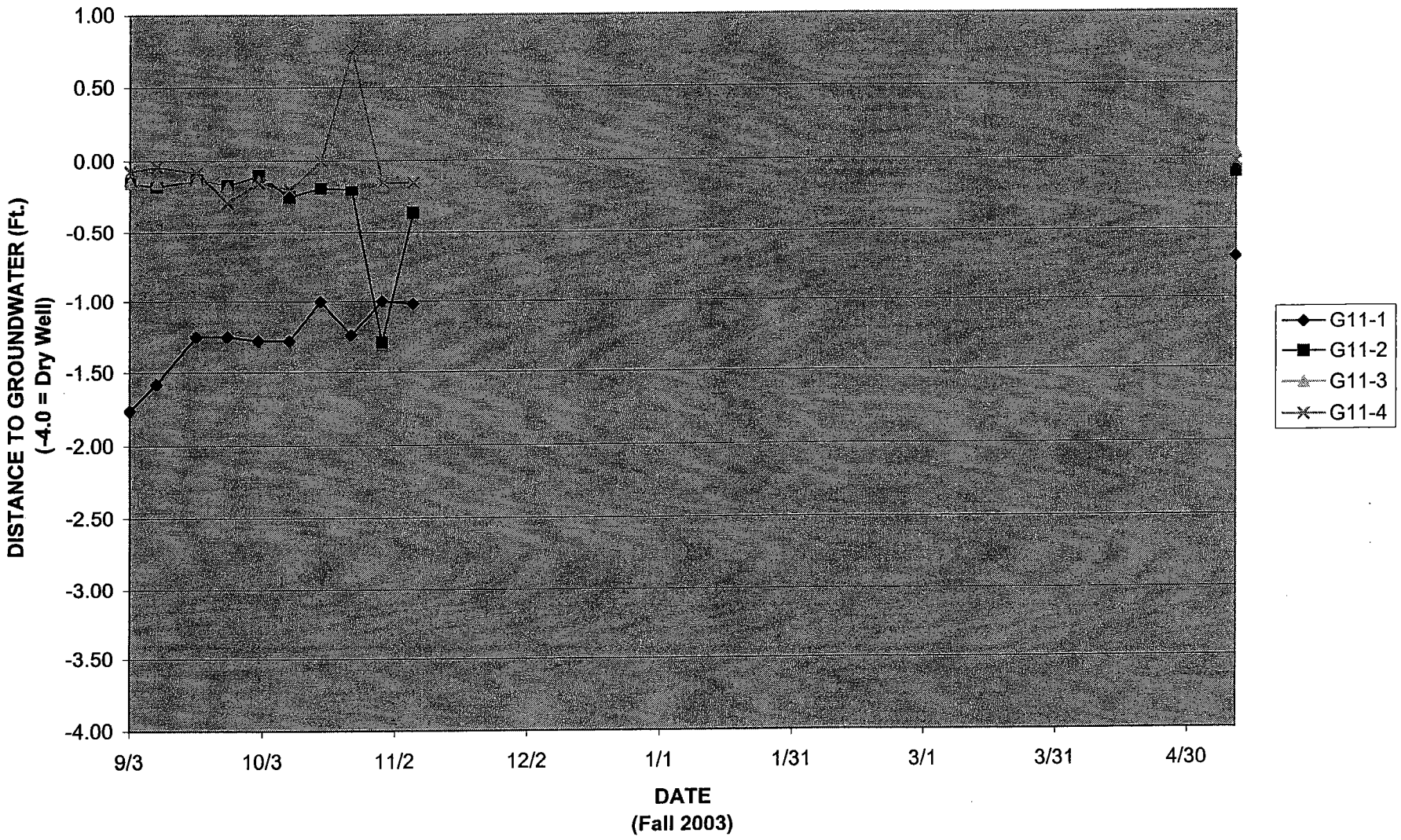
G9 WETLAND

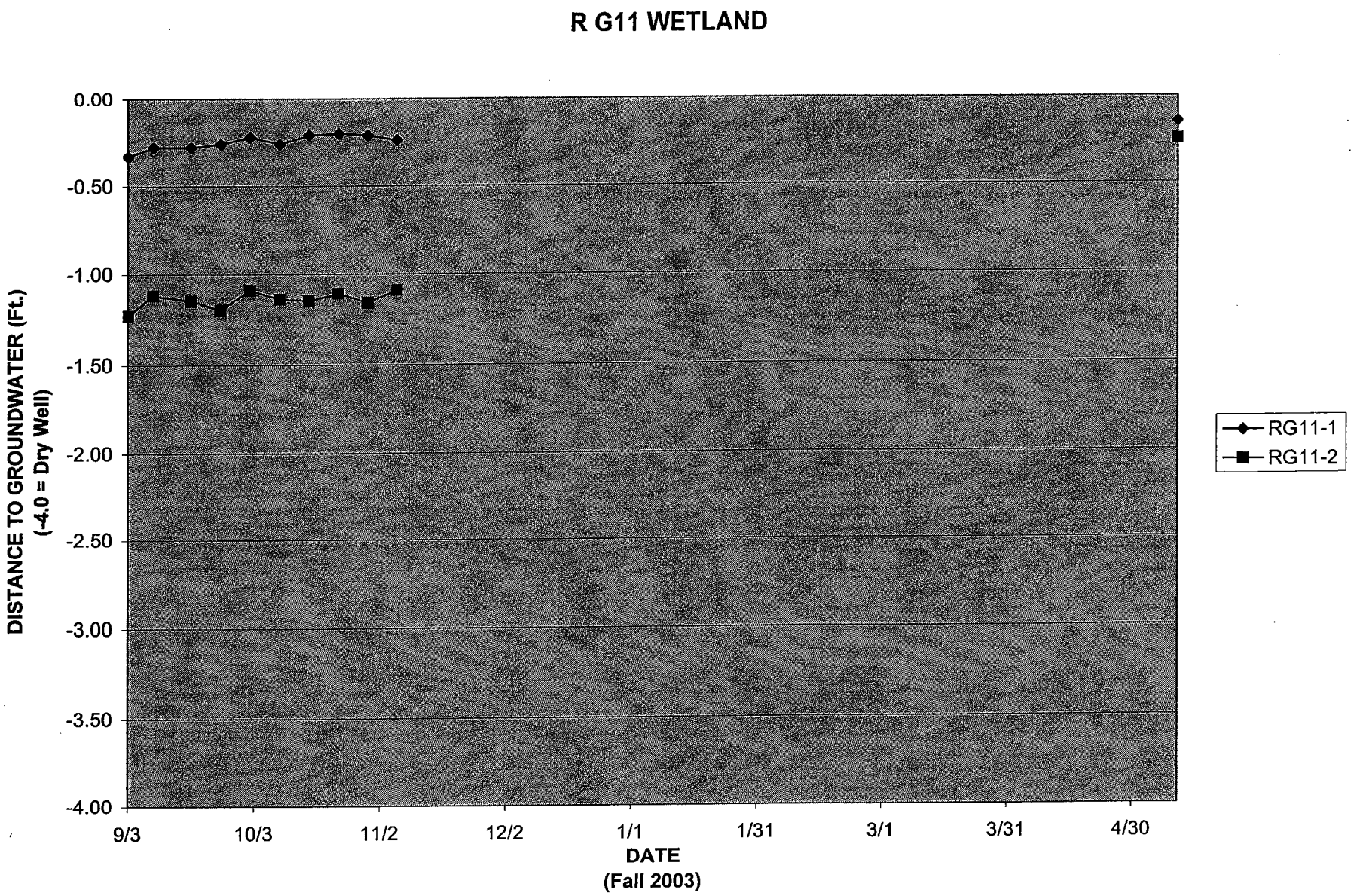

0.50
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
DISTANCE TO GROUNDWATER (Ft.)
(-4.0 = Dry Well)
9/3
10/3
11/2
12/2
1/1
1/31
3/1
3/31
4/30
DATE
(Fall 2003)
G9-1
G9-2
G9-3

G10 WETLAND

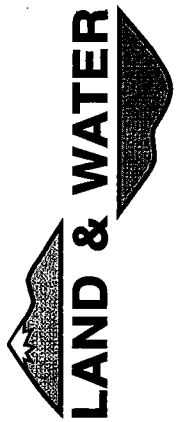

0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
DISTANCE TO GROUNDWATER (Ft.)
(-4.0 = Dry Well)
9/3
10/3
11/2
12/2
1/1
1/31
3/1
3/31
4/30
DATE
(Fall 2003)
G10-1
G10-2
G10-3
G10-4
G10-5
G10-6
G10-7
G10-8

G11 WETLAND


1.00
0.50
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
DISTANCE TO GROUNDWATER (Ft.)
(-4.0 = Dry Well)
9/3
10/3
11/2
12/2
1/1
1/31
3/1
3/31
4/30
DATE
(Fall 2003)
G11-1
G11-2
G11-3
G11-4


R G11 WETLAND
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
DISTANCE TO GROUNDWATER (Ft.)
(-4.0 = Dry Well)
9/3
10/3
11/2
12/2
1/1
1/31
3/1
3/31
4/30
DATE
(Fall 2003)
RG11-1
RG11-2

APPENDIX G



Appendix G

YMC Golf Course Progress Update

Yellowstone Mountain Club Golf Course
Wetland Restoration Project

LAND & WATER

YELLOWSTONE MOUNTAIN CLUB GOLF COURSE PROGRESS UPDATE

Site: **Zone:**

Activity Period: _____ Reported By: _____

Wells		Topography/Soil			Vegetation			Channel		
Well#	Monitoring Result	Work	Measurements	Other	Grass	Plugs	Other	Topography	Planting	other

Notes: _____

_____

Page ___ of ___

LAND & WATER